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**THE PROBLEM OF OTOSCLEROSIS AND ALLIED CON-
DITIONS.***

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Mr. President, Ladies and Gentlemen:

When I received the invitation of this Academy to give the anniversary address at the annual meeting, I need hardly say how highly I appreciated the honor and what a pleasure it was to me to receive it. To enjoy the recognition of one's colleagues is to receive the most gratifying stimulus which, as men engaged in the pursuit of medical science, we can expect; and when this recognition took the form of inviting me to come so far to address you, it evoked in me a sense of gratitude and of fellowship which I find it very difficult to express in words.

But in addition to this honor, your kindness has also given me the opportunity of seeing my colleagues in this country and allowing me to meet in friendly gathering many who have only been known to me hitherto by their names and their work. Of the value of such intercourse it is impossible to speak too highly, and for the opportunities you have thus afforded me as well as the honor you have conferred on me, I beg you to accept my most grateful thanks.

In choosing the otosclerosis question for the subject of my address, I was fully aware of the fact that a discourse upon the disease in all its bearings would be too long to be included in the time at my disposal. On consideration, I came to the conclusion that for the present purpose, perhaps the two most interesting

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aspects of the subject would be, first, the anatomical changes that occur; and second, the relationship which hereditary tendency bears to the disease.

I will proceed at once, therefore, to give a very short description of the pathological conditions which are actually, or have been considered to be characteristic of the disease. And here, at the very outset of the subject, we are met by the question, what is the first change that occurs. This has been answered by different authorities in three different ways. First, there are those, represented by Habermann and Katz, who maintain that in the first place the middle-ear is affected, and that subsequently the bony transformation in the capsule of the labyrinth follows as a result of the inflammatory activity in the middle-ear. A second group of investigators hold that the disease is primarily of nervous origin, the first change being in the nerve-structures of the labyrinth, or of the auditory nerve and its ganglionic connections. According to these observations also, the bony change in the capsule of the labyrinth is a secondary process. The third and largest group of investigators are of the opinion that the change in the bony capsule of the labyrinth is the essential feature of otosclerosis, and that the pathologic changes sometimes found in the middle-ear, and in the sound-perceiving apparatus, are merely coincident or secondary.

Now, without going more deeply into these questions at present, it may be said that the change in the bony capsule of the labyrinth is, at least, the outstanding feature of the disease. Indeed, without such a change it would not be justifiable to speak of a case as being one of otosclerosis. And it is noteworthy that Manasse, who holds the view that the condition is primarily a change in the sound-perceiving apparatus, would banish the name otosclerosis altogether.

Speaking in general terms, the typical cases which we call otosclerosis present clinically the following symptoms: deafness of insidious onset, relatively prolonged bone-conduction, a loss of hearing for the lower notes, and a normal position of the tympanic membrane. Besides these symptoms, there is sometimes present a rosy tint in the region of the promontory, and paracusis and tinnitus are often referred to by the sufferers. Now, the evidence is very preponderatingly in favor of the view that these symptoms are due to a change in the bony capsule of the labyrinth, which has its seat usually in the region in front of, and above the oval window, and leads to the bony fixation of the stapes. Frequently, of course, foci of bony transformation are present in the other por-

tions of the capsule of the labyrinth, but there is not, as far as I am aware, any clear evidence that changes in such regions ever produce the characteristic signs and symptoms which, clinically, we term otosclerosis. I will therefore proceed to show some slides illustrating the condition.

The first slide¹ was prepared from a case of otosclerosis in its earliest stage. The stapes being united with the walls of the oval window by bone, remained fixed in position when the soft parts were removed. The object is viewed from the tympanic aspect.



Figure 1.

The next slide² shows the same specimen viewed from the vestibular aspect, and it will be seen that the foot-plate of the stapes is continuous with the inner surface of the bony labyrinth. In macerated specimens such as this, the new-formed bone is whiter than the normal tissue, and it will be observed that it extends above, in front of and below the oval window. Both this and the preceding illustration may be seen to better advantage in my book on "Diseases of the ear," where they are reproduced in stereoscopic relief.

Passing now to consider the bony changes in greater detail, it is necessary to employ microscopic sections for the purposes of illustration. But, before doing so, I shall put on the screen a slide³ illustrating the appearances as seen when the bone is not diseased. This slide was prepared from the temporal bone of a very old woman, (aet. 101) who was absolutely deaf to all sounds. It was a case in which the deafness was due to disease of the sound-perceiving apparatus, and not to otosclerosis. The bone is quite



Figure 2.

healthy, and it is particularly to be noted that there is no spongification in the neighborhood of the oval window and stapes.

The next slide⁴ shows the same degree of magnification as the last, the conditions found in a very early case of otosclerosis which had been examined by me during life. The section passes through the right temporal bone at very nearly the same level as in the case of the last slide. The foot-plate of the stapes is visible, but the crura are below the level of the section.

In the wall of the labyrinth, immediately in front of the foot-plate of the stapes, may be seen a circular area of bone, more

darkly stained than the surrounding healthy bony tissues. This portion consists of the newly-formed bone, characteristic of the disease. Another focus of the same nature is seen to the right of the apex of the cochlea and reaching up to the membranous wall of the latter.

Even with this slight degree of magnification it will be observed that the new-formed bone is much less dense than the healthy tissue, and hence the process has been termed spongification or osteoporosis. It is to be noted that the new-formed bone is separated from the surrounding bone by a very sharp line of demarkation. Further, in this particular specimen, the new-formed bone has not



Figure 2.

invaded the stapedio-vestibular synostosis, and it may be added that in none of the series of sections from this case was the new bone found definitely to cross over into the foot-plate of the stapes. In other words, actual bony ankylosis has not yet occurred, it being a very early case.

The next slide⁵ is prepared from the same section as the last and shows the region in front of the stapes more highly magnified. To the left is seen a small portion of the anterior end of the foot-plate of the stapes, while the newly-formed spongy bone is seen in the middle of the field; and it may again be noted that the stapes is not involved in the bony change. The spaces seen in the spongy bone are occupied by bone-marrow, a condition not found in the normal capsule of the labyrinth.

The next slide shows the appearance present in the left temporal bone of the same case. The section passes horizontally below the region of the foot-plate of the stapes, but portions of both crura are seen. The spongy new-formed bone is very darkly stained in comparison with the feebly-stained normal bone-tissue. On this, the left side, the pathological bony change did not involve the stapedio-vestibular synostosis, as was also the case on the right side.

The next slide was not prepared by myself, but was very kindly given to me by Prof. Bruehl, of Berlin. It illustrates very clearly a case in which the pathological change had proceeded further than

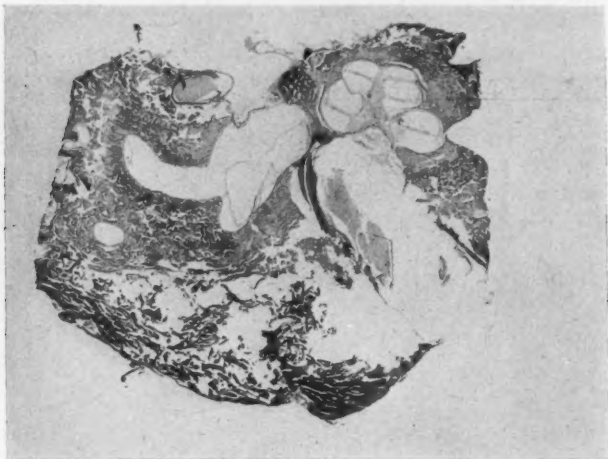


Figure 4.

in my own, just shown. In this slide it will be seen that in the spongification process, the stapedio-vestibular synostosis has been involved, and the stapes itself has been invaded.

In the next slide, which I prepared from one of my own sections, the stapedio-vestibular synostosis is seen much more highly magnified. The darkly-stained new, spongy bone comes into very close relationship with the synostosis, but does not actually involve it, except, perhaps, at a minute area towards the upper part of the slide. At that point there is a cell on the stapelial side of the synostosis which certainly does look like an osteoblast in the process of depositing calcareous salts.

The next slide shows appearances similar to the last and is also rather highly magnified. The more darkly stained area shows the minute structure of the newly formed spongy bone. The osteoblasts

are seen lying in their bony matrix. The clear portion to the right shows the foot-plate of the stapes, and between the latter and the bone is the annular ligament. The section passes very obliquely through the upper portion of the synostosis.

The next slide⁶ is shown for the purpose of illustrating the condition of the organ of Corti in the case from which the previous slides have been prepared. It shows nothing at all abnormal. Of course the appearances are not those which are found in the organ of Corti of an animal in which the structures have been put in a fixing fluid at the moment of death. But in the human subject it is impossible to fix the tissues of the temporal bone until many hours

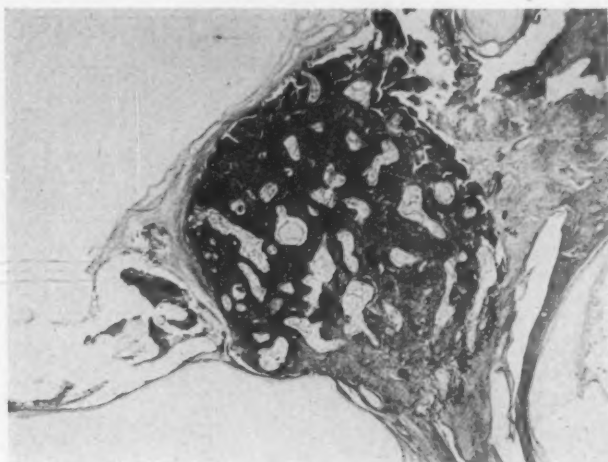


Figure 5.

after death, and during this interval maceration occurs. Hence, although the hairs themselves remain, the hair-cells have disappeared; but this is also found to be the case when one examines the structures under the same circumstances in subjects who have had perfectly normal hearing during life. There is no depression in the membrane of Reissner, and the rods of Corti and the tectorial membrane are normal in appearance. I may add that the ganglion spirale and the auditory nerve presented no abnormality.

Having, then, briefly described and illustrated the anatomical changes that occur in otosclerosis, we may proceed to consider the relationship which the hereditary tendency bears to their occurrence. In recent times the subject has been investigated by Hammerschlag, by Koerner and by others.

It is, of course, indisputable that hereditary tendency does bear a very definite relationship to the disease. Unfortunately, however, there is but little agreement as to the nature, meaning and extent of this relationship. Such divergence of opinion is, after all, not surprising, when we reflect how much difficulty there is in ascertaining the relationship of hereditary influence to simple and normal anatomical conditions. Since such is the case, it would be surprising if the relationship of hereditary tendencies toward pathological conditions were not even more mysterious and obscure. At present it is more desirable to gather facts from all possible sources which have a bearing on the question before definitely formulating an

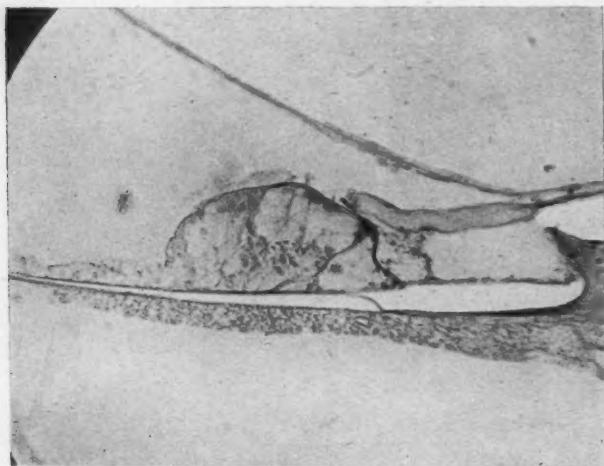


Figure 6.

opinion. This, therefore, is the excuse which I tender for drawing your attention to some details in the features of the family-trees to be shown in the following slides. These family-trees have not been selected for the purpose of illustrating very marked hereditary tendency in respect to otosclerosis, but rather to point out certain features in the trees selected.

This slide⁷ shows the tree over three generations on both the paternal and the maternal sides of a family of which I have personally examined all the deaf members in the present generation. The family consists of nine members, the oldest being 47, and the youngest 25 years of age. Of the nine, six are deaf, and all these are victims of otosclerosis. On the paternal side it will be seen

that of a family of ten, only one was deaf, and the father himself did not suffer, though he reached an age far beyond that at which otosclerosis makes its appearance. The paternal grandfather himself, however, was dull of hearing; but all that is known of his deafness is that it appeared in middle-life.

On the maternal side, out of a family of thirteen, two were dull of hearing in middle life, but the mother herself, who is still alive, is not affected. The maternal grandmother was deaf. Finally, out of forty first- and second-cousins on the father's side, none are deaf, and out of thirty first- and second-cousins on the mother's side, only one is deaf, that one being shown on the slide.

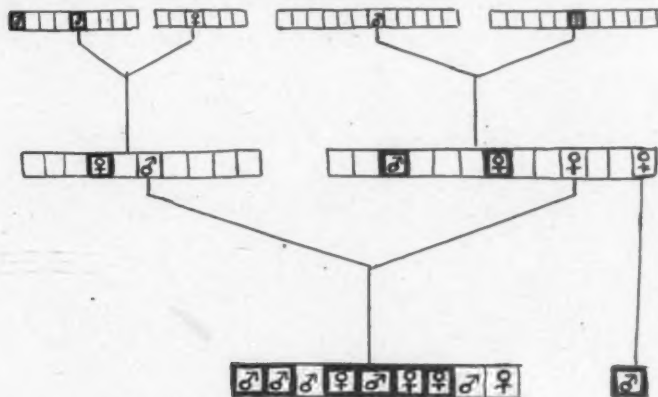


Figure 7.

How is this curious incidence of otosclerosis to be accounted for? Mere coincidence, I venture to think, is out of the question, and the environment of the family has always been very satisfactory. The only explanation I have to offer is that on both the paternal and maternal sides there is a slight tendency to otosclerosis, and by the union of the two families, the weakness has been very markedly accentuated. It is important to add that the two youngest members of the family are respectively 30 and 25 years old, so that it is quite probable that one of these may develop otosclerosis, and not improbable that both may do so.

The next slide^a shows a family-tree, on both paternal and maternal sides; and in this, as in the preceding case, there is clear evidence of deafness on both these sides.

The family of the present generation consists of six members, the oldest of whom is 37 and the youngest 28. Of the six mem-

bers, three are deaf, and these have all been examined by me, and are all typical examples of otosclerosis. The oldest member of the family is not deaf at all. The second began to suffer from otosclerosis at the age of 29. The third is not deaf at all. The fourth began to suffer from otosclerosis at the age of 29. The fifth is not deaf at all. The sixth began to suffer from otosclerosis at the age of 22.

Taking the paternal side of the previous generation, it will be seen that the family consists of eight members of whom two are deaf, and the father of the present generation is one of these. I have examined him and found him to be the subject of otosclerosis,

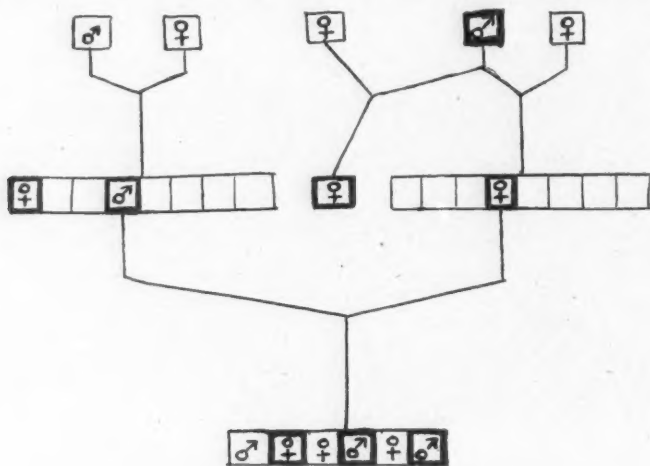


Figure 8.

but only in a mild degree. It is further of interest to note that the deafness did not make its appearance until the age of about 55. Neither of the paternal grandparents were deaf.

On the maternal side the family consisted of eight members and a step-sister. Of these eight members, only the mother herself suffers from otosclerosis. The deafness made its appearance about the age of 30, but it has never been very severe in degree. The step-sister is also deaf, but I have not had the opportunity of examining her and cannot definitely say whether the deafness is due to otosclerosis or not. The maternal grandfather was dull of hearing about the age of 50 and became progressively worse. Neither the maternal grandmother nor the step-grandmother were deaf, so that there is

a very strong suspicion that the maternal grandfather transmitted a certain tendency to deafness to the two families by his two wives.

In this case, as in the first, therefore, we appear to have evidence of a family tendency to otosclerosis on both the paternal and maternal sides. In this family-tree, however, both parents suffered in a mild degree from otosclerosis, whereas in the first tree both parents were free from the disease. On neither side, however, is the tendency at all pronounced, but in the offspring of the marriage, otosclerosis manifests itself with great severity. This view is supported by the evidence derived from deafness among the cousins.

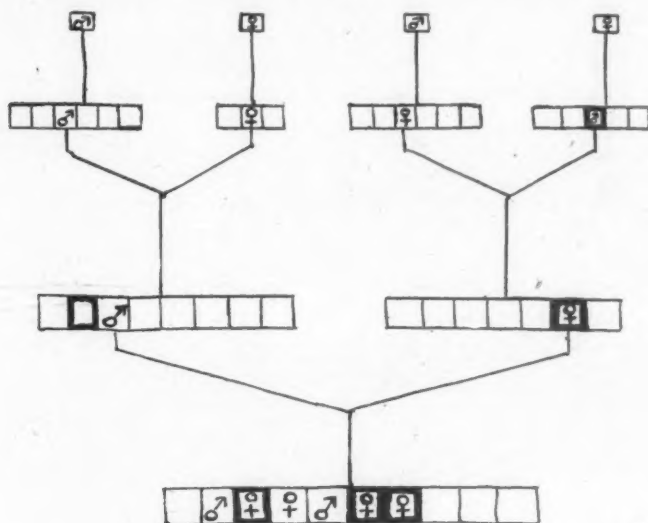


Figure 9.

There are in all forty first-cousins, of the present generation, and of these only one is deaf. Of many second-cousins, number not known, only two are deaf, but it is significant that these two are brothers. They are on the paternal side.

Before leaving this subject of the effect upon offspring of the marriage of two individuals having a tendency to otosclerosis, I should like just to mention an even more marked case described by Hammerschlag. In his case an uncle married a niece, both of them sufferers from otosclerosis. There were seven children of the marriage, and every one of them became deaf.

The two first family-trees throw light upon a very practical question which sometimes arises in respect to otosclerosis. It has been

suggested by Koerner, and the suggestion is supported by some other aurists, that the victims of otosclerosis should be discouraged from marrying. Now, in so far as this advice is given with the object of preventing the birth of a certain number of individuals who would run the risk of developing otosclerosis when they reached adult life, it may be quite sound. Because there is no doubt that, taken over large numbers, the children of otosclerotics are rather more liable to suffer from the disease than those who are born of normal hearing-individuals. But if it be regarded from the wider aspect of attempting to eliminate otosclerosis from the list of human troubles, it is open to serious question whether it is right to advise against mar-

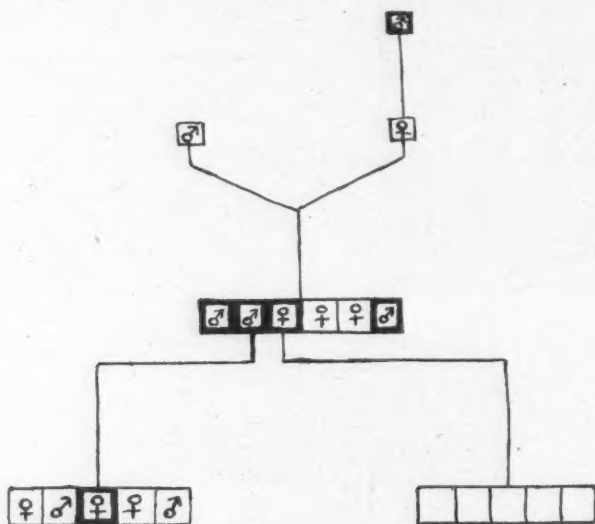


Figure 10.

riage; and the reason is obvious from an inspection of these two tables. Otosclerosis arises frequently in families in which the disease is either not present at all in the parents, as in the first family tree, or makes its appearance in the parents long after marriage has taken place. While, therefore, the forbidding of marriage of otosclerotics would, to a certain extent, diminish the number of sufferers, it is evident that this diminution would be very slight for, at any rate, many generations.

Now, when we consider that amongst practically all the white races the birth-rate is steadily diminishing, it must be obvious to any

physician that to give advice tending to emphasize this condition of affairs is to undertake a very serious responsibility. The sufferer from otosclerosis is not, like the deaf-mute or the insane, a cost to the state, nor like the victim of pulmonary tuberculosis, a danger to his neighbors. He is, in general, a valuable citizen, though his defect may necessitate the direction of his activities into a channel different from that which they might otherwise have followed.

The next slide^o is shown in order to illustrate the effect of local inflammatory mischief in the ear upon an individual in whom there was already a family tendency, though not very marked, towards otosclerosis.

In the present generation, the family comprised originally ten members, but of these two died in childhood. Of the remaining eight, three are deaf, and all have been examined by me. Of these the two oldest are undoubtedly subjects of otosclerosis. The young-

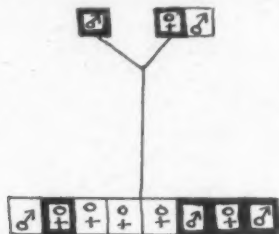
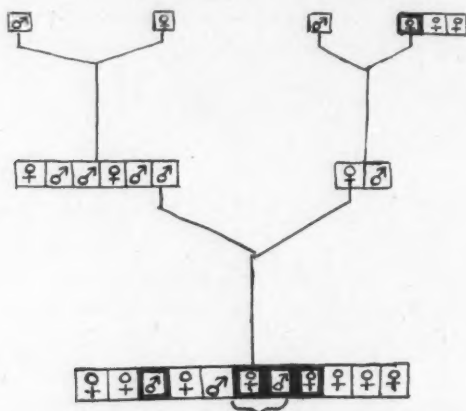


Figure 11.

est of the three deaf patients is the one to which particular attention is to be drawn. This patient, aged 21, is extremely deaf. She cannot hear the watch or the whispered voice at all, and the shouted voice can only be heard when it is very loud and within two or three inches of the ear. Rinne's test gave -5 seconds in the right and -7 seconds in the left ear. Schwabach's test gave -3 or -4 seconds in the right and -5 in the left ear. Thus, although Rinne's test was negative in both ears, yet the bone-conduction was diminished. The high notes on Galton's whistle were remarkably well heard considering the severe deafness, but the hearing for the low notes was very seriously affected in both ears. The tympanic membrane on the right side was almost completely destroyed by a long antecedent suppurative process, and this allowed of a remarkably extensive view of the contents of the tympanic cavity. All the ossicles were present, and the tip of the hammer was adherent to the wall of the promontory. The anterior portion of the stapes and the long process of the anvil were visible, and there were no adhesions

found in these parts. The round window was, as far as was visible, quite free of obstruction, and the mucous membrane was thin, dry and glazed. Indeed, the appearances were all those which one would expect to find associated with comparatively good hearing. In the left ear the membrane was almost entirely destroyed, and there was a slight purulent discharge associated with some degree of swelling of the mucous lining of the tympanum, and this prevented the clear view of the parts that was possible on the right side. The history of the case showed that the patient heard well until the age of nine, when she suffered from a double suppurative otitis media. After about a year, the suppuration was healed on the right side, but on the left side it continued until the present



also was deaf. One aunt on the father's side was dull of hearing, but the nature of the deafness could not be ascertained.

The next slide¹⁰ shows the family-tree of an individual in whom otosclerosis made its appearance at a much earlier age than is usual. The present generation consists of five members, of whom the oldest is 18, and the youngest is 5½ years old. Of these only one is as yet deaf. She began to suffer from tinnitus and deafness at the age of 13, and is a typical case of otosclerosis. I have little doubt that in the course of time other members of the family will also fall victims to the disease. The father's family consists of six members, of whom four are deaf. Of these four, the father himself is one, and I have found on examination that he suffers from typical otosclerosis. The disease began about the age of 31. In the three other deaf members of the father's family, two suffered from paracusis and tinnitus in addition to deafness, and the third

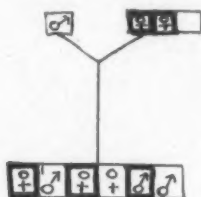


Figure 13.

suffered from tinnitus, but whether paracusis was present in his case cannot now be ascertained. In none of them is there any history of suppuration. The paternal great-grandmother was deaf, but the nature of the deafness could not be ascertained. On the maternal side there is no history of deafness in any of the relatives.

The next family-tree¹¹ is very incomplete, because my patient went abroad almost immediately after seeing me and I had not time to look up the details of the question. In this case, however, the matter is of less importance than in most, because the members of the family themselves recognize that on the mother's side deafness has been a very marked feature in their ancestry for at least four generations.

The present family consist of six members, the oldest being 41 and the youngest 21 years of age. Of the six, three suffer from otosclerosis. The most interesting of the three cases is that of the oldest, and I will mention a few details concerning her case, because it illustrates an important point in regard to the etiology of the disease.

There was no affection of the hearing in either ear until the patient was 25 years of age. At that time she was one day out fox-hunting, and during a long run was exposed to a bitterly cold east wind on her left side. An hour or so after returning home she began to suffer from acute middle-ear inflammation which lasted three or four days; but suppuration did not ensue. Her medical attendant at the time gave her a good prognosis in regard to her hearing; and in this he was quite justified, for, as we all know, in acute middle-ear inflammation without suppuration the hearing almost invariably returns to the normal in the course of a few weeks at most. Unfortunately, in this case, however, the prognosis proved incorrect, and the deafness in the left ear has gradually increased ever since. This left ear is the seat of a typical condition

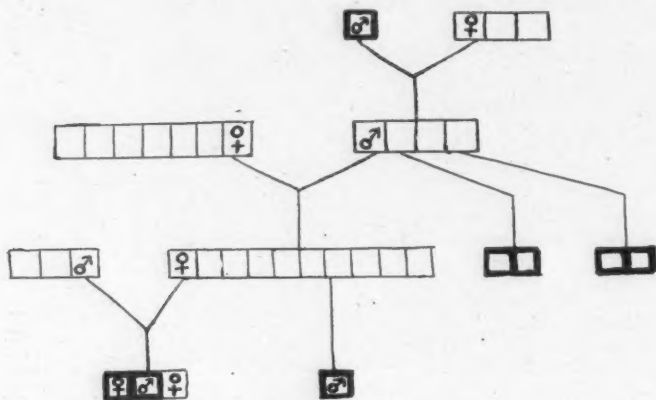


Figure 14.

of otosclerosis the characteristic rosy tint over the region of the promontory being present, as well as the other symptoms of the disease.

The hearing of the right ear remained perfectly good until three years ago, when she noticed that it also was becoming gradually dull, and this was associated with a mild degree of tinnitus in the left ear. A few months previously the patient had suffered from an attack of appendicitis, but it did not occur to her or to her medical attendant that there might be any connection between the abdominal trouble and the dullness of hearing. A second attack of appendicitis occurred, and then a third which was so severe as to necessitate an operation for the removal of the appendix. Within

a few months after the operation the tinnitus disappeared, and the deafness is not as yet noticeably worse. On present examination it is found that the right ear also is the seat of typical otosclerosis, the rosy tint over the region of the promontory being present as in the left ear.

Thus, there is in this case an interval of more than twelve years between the onset of otosclerosis in each ear respectively. I think that there can be no doubt that the acute middle-ear inflammation must be held responsible for initiating the otosclerosis in the left ear. In regard to the right ear, the association between the appendicitis and the otosclerosis is certainly not quite so clear, but the coincidence is very suspicious, especially when we bear in mind the fact that the tinnitus disappeared after the removal of the appendix.

The next slide¹² is shown to illustrate the difficulty in some cases of estimating the extent to which the hereditary element is present in a given family. The present generation consists of eleven members, and of these, four are the subjects of otosclerosis. Two of those affected are, moreover, twins, but they are not "identical" twins. No exciting cause could be found to account for the condition in any of the four. In spite of this, inspection of the family-tree shows very little evidence of otosclerosis. The maternal grandmother was deaf, but no proof is now obtainable that her deafness was due to otosclerosis.

From this family-tree, therefore, we cannot draw any very satisfactory conclusions with regard to heredity. The tree must be allowed at present to stand as a record of fact.

The next genealogical tree¹³ can only be analyzed over the present and immediately preceding generations. The patient was unable to give any information concerning her grandparents. It is shown for three purposes. The first is to point out the difficulty of getting some individuals to admit that there is any tendency to deafness in the family, even in the face of the most unquestionable facts recognized by the sufferers themselves. The second point is to show another case in which the tendency was very probably inherited from both paternal and maternal sides; and the third is to show how different factors may act in calling otosclerosis into existence when there is an inherited tendency to the disease.

The present generation consisted of eight members, but of these, one died in early childhood before reaching the age at which otosclerosis is liable to manifest itself. Of the remaining seven, four are deaf. The oldest of the four patients attributes her deafness to scarlet fever, and in a sense this may be correct. But there is

no history of pain in the ear during the scarlet fever, nor any suppuration. The deafness is, moreover, bilateral. She suffers from severe tinnitus in addition to the deafness and paracusis is marked. There are therefore, two possibilities as to causation in this case. First, it may be a case of adhesive processes occurring after scarlet fever, and second it may be a case of otosclerosis in which the scarlet fever was merely the exciting cause in an individual in whom there was a marked family tendency to the disease.

The next deaf member of the family is at present 46 years old. Tinnitus and paracusis are both present, and there is no history of suppurative disease or pain in the ear. The deafness is bilateral. Now in this case the deafness is attributed to a fall from a horse. But on inquiry it appears that the accident was not very serious, for the patient was up and out of doors two days after it. There was no giddiness nor any symptom pointing to direct injury to the labyrinth. Furthermore, the deafness did not make its appearance until a few weeks or a month after the accident. In view of the history and symptoms of the case, associated with what is known of the family history, there is, I think, little doubt that this also is a case of otosclerosis occurring in a family in which there is a marked tendency to the disease, though possibly the accident may have been the exciting cause.

I examined the third deaf member of the family and found the case to be one of typical otosclerosis. In this case the patient attributed the deafness to a rather prolonged period of sea-sickness. While the sea-sickness may have been the exciting cause, I am not willing to admit that it alone could produce otosclerosis, unless there was an inherited tendency to the disease.

In the fourth deaf member of the family, the deafness, which is bilateral, is associated with paracusis. I have not had an opportunity of examining him. The deafness was attributed to colds in the head and nasal polypus, and this, probably, with justice. But again I venture to think that the nasal conditions were the immediate cause only.

In the previous generation, the father's family consisted of one member only, the father himself. He suffered from bilateral deafness, considerable in degree and associated with paracusis. It cannot be ascertained whether tinnitus was present or not. Nothing is known of the paternal grandparents.

On the maternal side, the family consisted of two members, the mother herself and a brother. The mother suffered from bilateral deafness associated with paracusis, but it is not known whether

tinnitus was present or not. The brother in this generation was not deaf. Of the maternal grandparents nothing is known at all.

When the family-tree is considered in relation to the individual cases, it appears to illustrate the condition in which an inherited tendency to otosclerosis may be made manifest through the intervention of different local and constitutional conditions.

The last slide¹⁴ shows a family-tree in which deaf-mutism was associated with otosclerosis, but the question as to whether there is any relationship beyond mere coincidence must remain in some doubt. Four members of the present generation are shown on the screen, one family of three and another family of one.

Of the first family, the oldest is 9 years of age. She is said by her mother to have always been a little dull of hearing and was a little late in learning to speak, but at the age of 4 years she was able to speak fairly well, and is now quite a good speaker, having a vocabulary not noticeably inferior to that of normal hearing-children. For the last six months the mother has noticed that the child has become much duller of hearing. Bone-conduction is prolonged. The membrane is normal in position on both sides and shows a rosy tint over the region of the promontory; the low notes are lost to a relatively considerable extent. The second child of this family is 6 years old. I have not had the opportunity of examining her, but she is a deaf-mute, and, according to her mother, always has been completely deaf. The third child, aged 5, has at present quite normal hearing and speaks well. The cousin is a deaf-mute.

In the previous generation, there is on the father's side no known history of deafness or deaf-mutism. On the maternal side it is curious to note that in the mother's own family, out of a large membership of ten, none are either deaf or deaf-mutes, but a niece (already referred to) is a deaf-mute. Furthermore, the mother has four cousins who are deaf-mutes.

Among both the maternal grandmother's family and the maternal grandfather's family, there is no deafness or deaf-mutism. The maternal great-grandfather, however, became deaf shortly after the age of 5, and lost what speech he had already learned.

This tree is interesting, therefore, as showing that hereditary deaf-mutism is not always congenital, and may even make its appearance as late as the fifth year of life. It also shows how the defect may lie latent over one or even two generations. And finally, it suggests the possibility that otosclerosis occurring at a very early age may be associated with deaf-mutism in the same family. More

facts will have to be gathered before we can say whether in respect to the last-mentioned association there is any causal relationship.

Now, before bringing my address to a close, I should like to make a very few remarks upon the conclusions which we draw from a consideration of these family-trees. And I must admit that such conclusions are destructive rather than constructive in their nature.

1. In the first place, it is clear that the relationship of hereditary influence to otosclerosis is much more complex than has been supposed, but at the same time, such relationship is very close.

2. It is quite futile to attempt to divide cases into those due to hereditary influence and those not due to this cause. And, consequently, it is not only useless but actually misleading, to refer to a certain percentage of the cases as being inherited. Each aurist will hold a different opinion as to what constitutes evidence of inheritance, and such estimates, therefore, become merely statements of opinion.

3. In all cases, however clear the evidence of hereditary tendency may be, local and constitutional conditions may play an important part in determining the onset and course of the disease.

4. The attempt to attribute all cases of otosclerosis to inheritance from some more or less remote ancestor, who may have suffered from the disease, is, at present at least, unjustified. A great deal more must be learnt in respect to the general laws of inheritance before conclusions can be drawn concerning the relationship which exists between inherited tendencies and pathological conditions such as otosclerosis.

At present it is our duty to collect as much evidence as possible concerning this subject. When this has been done, we shall not only be in a much better position to give an opinion in regard to treatment and prevention; but shall also be able to offer a large amount of material for the study of heredity in general, a study which I am convinced, is destined to play an increasingly important part in medical science.

The study of the causation of disease in many of its most important aspects has been obscured and narrowed during the last twenty years by the ascendancy which bacteriology has obtained in pathology and medical science generally. There is evidence that a wider outlook upon processes of disease will be taken in the near future; and then, it may be hoped, the physician will again reign in his own household.

14 Newton Terrace.

THE APPLIED ANATOMY OF THE EUSTACHIAN TUBE.*

BY J. A. BACHER, M. D., SAN JOSE, CAL.

During the last year, interest in the applied anatomy of the Eustachian tube has greatly increased on account of a revival and an extension of the practice of applying medication to its lumen and on account of renewed interest in the procedure of closing it off from the middle-ear by curettage. My interest in its anatomy was first directed to the arc formed by a line running along the anterior wall of the osseous auditory meatus through the middle-ear and on down the lumen of the tube; in other words, to the proper curvature, anatomically, for a curette suitable for use in closing off the tube when working through the external auditory meatus. After obtaining the average radius of curvature of this arc in a number of specimens from the dissecting-room, my interest was augmented, and carried me to a short study of the comparative and of the human anatomy of the entire tube.

The material for determining the curette curvature consisted of five specimens in which the osseous external auditory meatus, the middle-ear, and approximately the tympanic half of the tube were available. For the study of the entire human tube, ten adult half-heads, five half-heads of the infant at birth, one head of a fetus 27 cm. long, and one head of a fetus 32 cm. long were used. One head of each of the following animals—hog, calf, sheep, dog, cat, and rabbit—were used in the study of the comparative anatomy. The method best adapted for this work was learned by experience. Dissections exposing the parts could be made, measurements taken, and the specimens drawn. This was done. But it seemed that a better method was to make casts of the specimens. Casts give exact contours and dimensions, and are better adapted for demonstration. With suitable instruments the superior wall of the osseous external auditory meatus, middle-ear, and Eustachian tube was very carefully removed, the remaining parts being undisturbed. Modeler's clay was used to bank up the parts so that the molten composition metal could be poured in and retained. The excess of the metal was removed while still in position, by melting it off with a hot metal rod, the end of which was flattened and five millimeters wide. Enough bone was then removed from the specimen to allow the cast

*The material upon which this paper is based is from the laboratory of the Harvard Medical School, and the work was done under the direction of Dr. H. P. Mosher.

to be freed. This required care to avoid breaking the cast. It is especially liable in the adult to fracture at the isthmus; it is hard to remove intact in the larger animals, very easy in the infant and fetus. Plaster of Paris and ceresin are very difficult to remove intact. They were tried and abandoned. In making the casts of the fetus, small pieces of metal were placed in the cavities, melted with the heated rod, and worked into position. Piano wire was used to fill the lumen of the tube of the smaller fetus.

COMPARATIVE ANATOMY.

In the hog, Figure 1, the pharyngeal orifice is a semilunar slit 19 mm. in height with its concavity directed anteriorly and its long

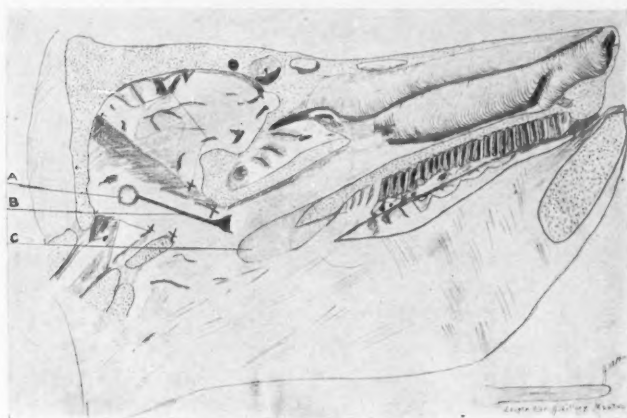


Figure 1.

Sagittal section of head of hog. The tube has been laid open.
A. Middle Ear. B. Eustachian Tube. C. Soft-Palate.

axis approximately vertical. The posterior border of the slit is raised above the level of the anterior. In the casts, Figures 8 and 9, the most striking feature is the length of the external auditory meatus. It is 59 mm. in length while the Eustachian tube is 38 mm. The length of the canal is 1.55 times the length of the tube. The middle-ear is small.

In the calf, Figure 2, the pharyngeal orifice is roughly semilunar, its inferior arc having a longer radius than its superior. Its concavity is directed anteriorly and a line connecting the extremities of this orifice has its superior end bent about 40° posterior to a vertical line. The orifice lies very far posteriorly on the pharyngeal wall. In Figure 3 a mass of pneumatic cells mounding under the posterior edge of the tube almost to its pharyngeal end is represented. Those

that are under its tympanic end are shown in the cast, Figures 10 and 11. The osseous external auditory meatus is 23 mm. in length and the tube 30 mm., the length of the canal being .77 of the length of the tube. The tube is straight, has no isthmus, but has a pronounced flare at its pharyngeal end.

In the sheep, Figure 4, the pharyngeal orifice is an exact semi-circumference of a circle with a radius of 6 mm. The concavity is directed anteriorly. A line connecting the extremities of the orifice is vertical. The edges of the orifice are exactly flush with the lateral pharyngeal wall and it is somewhat difficult to detect the

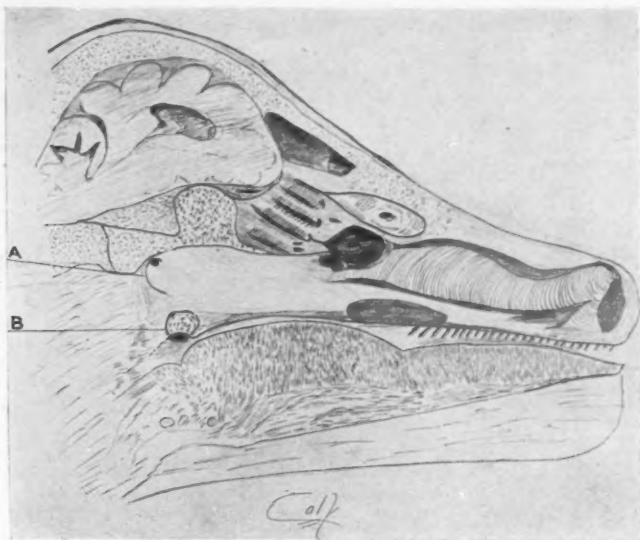


Figure 2.
Sagittal section of head of calf.
A. Pharyngeal Orifice of Eustachian Tube. B. Tonsil.

orifice. In the cast, Figures 12 and 13, the osseous external meatus is 25 mm. long and the tube 23 mm. and the ratio 1.09. The pharyngeal end of the tube is flared. The oval window is noticeably large.

In the dog, Figure 5, the pharyngeal orifice of the tube is semi-lunar. The concavity of the arc is directed posteriorly. In all the other animals it is directed anteriorly. The orifice is placed in the most superior position of the lateral pharyngeal wall, relatively higher than in any other of the animals I have examined. A line connecting the extremities of the orifice is not vertical. In the cast,

Figures 14 and 15, the osseous external auditory meatus is 18 mm. in length, the tube is 15 mm., and the ratio is 1.20. There is a small, sac-like dilatation from the floor of the tube near its pharyngeal end. This sac attains very large proportions in the horse and is called a guttural pouch. The circular depression surrounding the internal end of the meatus is the impression of an elevation like the ring on the bottom of a saucer and represents the annulus tympanicus. The semi-circular elevation that partially surrounds it is the imprint of a deep groove.

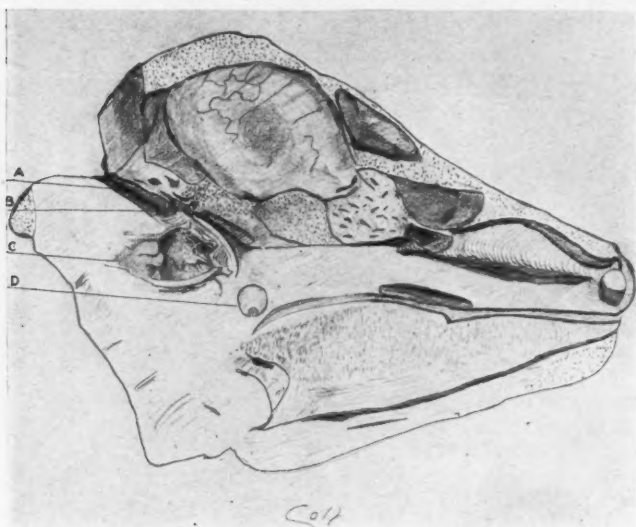


Figure 3.

Sagittal section of head of calf. The osseous external auditory meatus and the Eustachian tube are laid open.

A. Osseous External Auditory Meatus. B. Middle Ear. C. Mass of Pneumatic Cells Mounding Under the Tube. D. Tonsil.

In the cast, Figure 6, the pharyngeal orifice of the tube is a short, straight slit. The superior end of the slit is further anterior than the inferior end. In the cast, Figure 16, the osseous external auditory meatus is 7 mm. in length, the tube 5 mm., and the ratio 1.40. The annulus tympanicus is represented by a sulcus in the cast. The semi-circular elevation surrounding this sulcus is the impression of a deep groove. The tube is short, straight, and remarkably flared on its pharyngeal end. In the rabbit, Figure 7, the pharyngeal orifice is a short, vertical slit. In the cast, Figures 17 and 18, the

osseous meatus is 7 mm. in length and the tube the same, the ratio being 1. The annulus and its surrounding groove are shown. The tube is short and of uniform size.

SUMMARY OF THE COMPARATIVE ANATOMY.

In the animals the tube is relatively short, has a large caliber with no constrictions, begins from the bottom of the middle-ear, and so provides most efficient drainage. In all but the immature calf the osseous external auditory meatus is as long or longer than the Eustachian tube. This phenomenon is most marked in the rooting animal, the hog, in which it is one and one-half times the length of

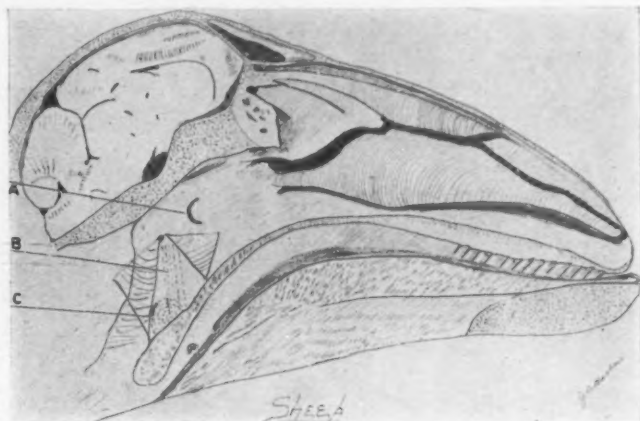


Figure 4.

Sagittal section of head of sheep.

- A. Pharyngeal Orifice Eustachian Tube. B. Fibres M. Levator Palati.
C. Tonsil.

the tube. The pharyngeal orifice of the tube is a semi-circumference of a circle in four of the six animals. The concavity of the arc is directed anteriorly in all but the dog. There is no marked cartilaginous projection bounding the orifice save in the hog. The pneumatic cells along the tube in the calf and the small guttural-like pouch in the dog are most interesting in comparison with human anatomy.

THE EUSTACHIAN TUBE IN THE HUMAN FETUS.

The casts of the middle-ear and Eustachian tube of the 27 cm. fetus, Figures 19 and 20, show that the middle-ear is placed horizontally, its length from without inwards being much greater than

from above downwards. The round window looks downward. The promontory is very conspicuous. The malleus and incus are in a pocket-like recess superior and external to the promontory in close to the skull. There is no osseous external auditory meatus. The osseous part of the tube is lacking. As the middle-ear is so narrow from above downwards, the diameter of the tube is almost as great as the depth of the middle-ear at its anterior end. The point of demarcation between the middle-ear and the tube is difficult, but in my judgment it is fair to call the tube 7 mm. long. No. 9 piano wire exactly fills the lumen of the tube. It is straight and of uniform caliber. The casts of the 32 cm. fetus, Figures 21 and 22,

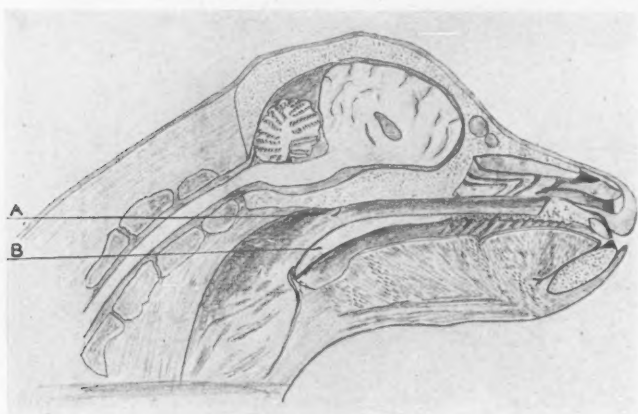


Figure 5.
Sagittal section of head of dog.
A. Pharyngeal Orifice of Tube. B. Soft Palate.

show a middle-ear with characteristics between those of the smaller fetus and the infant at birth. It is tipped slightly from the horizontal position, and is more roomy, being larger especially supero-inferiorly. The caliber of the tube is larger. There is no isthmus. The canal for the tensor-tympani is beginning to develop and shows in the cast as a slight projection superior to the tube.

The casts of the middle-ear and Eustachian tube of the infant at birth, Figures 23 and 24, show that the tube is placed horizontally and extends inwards and forwards 45° from the sagittal plane. The pharyngeal orifice is placed further forward than in the adult. The tube is straight and has no isthmus. In the five casts I have, the maximum length of the tube is 18 mm., the minimum 13 mm.,

and the average 15+ mm. The anterior wall of the middle-ear slopes off gradually into the floor of the tube. In other words, the tube drains the floor of the middle-ear and does not arise abruptly from the superior part of the anterior wall as it does in the adult. The casts show how gradually one merges into the other and have not the sharp right angle between the anterior wall of the middle-ear and the floor of the tube that those of the adult specimens will be seen later to have.

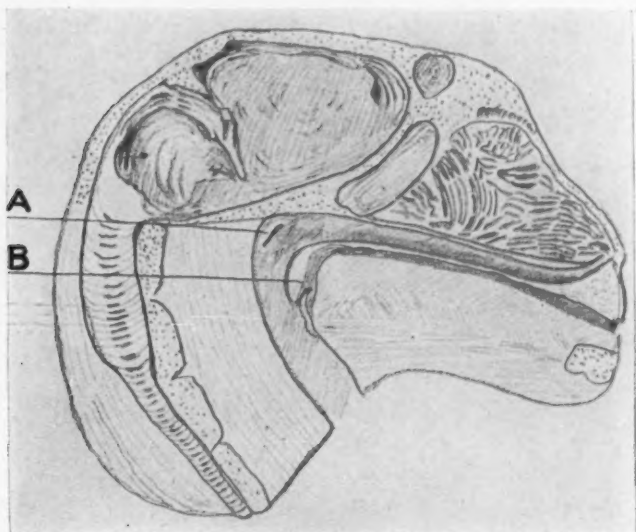


Figure 6.
Sagittal section of head of cat.
A. Pharyngeal Orifice of Tube. B. Soft Palate.

THE EUSTACHIAN TUBE IN THE ADULT.

In the casts, Figures 25-28, of the tube in the human adult, the promontory appears as a depression, the oval window as a projection. There is a pronounced rise from the floor of the middle-ear to the orifice of the tube. That is to say, the tube begins at the superior part of the anterior wall of the middle-ear in a position poorly suited for drainage. The anterior wall of the middle-ear meets the floor of the tube at approximately a right angle. This sharp angle is in marked contrast to the gradual way in which one merges into the other at almost 180° in the infant. The isthmus is shown. Constricting bands of mucous membrane between the

isthmus and the pharyngeal orifice were not found. More specimens would have to be examined for this to mean much. I believe they can be found. The carotid canal is shown in Figures 29 and 30. In the former it is exposed throughout its course in the temporal bone. It passes internal to the Eustachian tube and the bone separating them is particularly thin in the superior part of the crossing. There is danger of injuring this internal wall of the

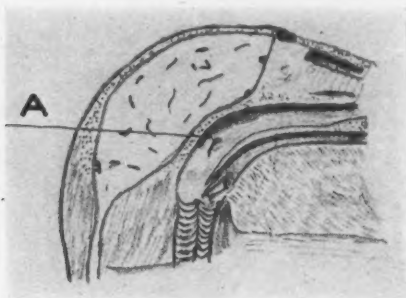


Figure 7.
Sagittal section of head of rabbit.
A. Pharyngeal Orifice.

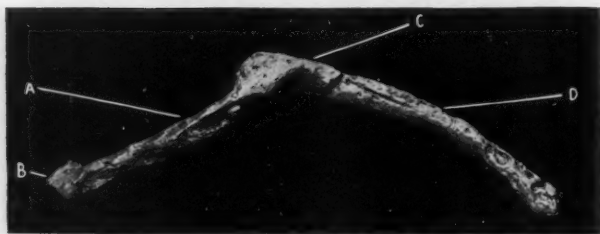


Figure 8.
The hog. Superior and external walls. Right side.
A. Eustachian Tube. B. Flare on Pharyngeal End. C. Middle Ear.
D. External Auditory Meatus.

tube with a curette that has not a sufficiently sharp curve. In Figure 30, the canal is exposed save where it passes beneath the tube. The floor and sides of the tube are intact.

THE CURVATURE OF THE EUSTACHIAN TUBE.

The degree of the arc that passes through the external auditory meatus, middle-ear, and tube varies greatly in different specimens. I have plotted the arcs running along the anterior edge of the



Figure 9.

The hog. Internal Wall. Right side. The tube is on the right, the osseous external auditory meatus on the left.



Figure 10.

The calf. Internal Wall. The tube is on the right. A mass of pneumatic cells extends down from the middle ear and mounds under the tube.



Figure 11.

The calf. External Wall. The tube is on the left. The flare at its end is not shown. A mass of pneumatic cells extends down from the middle ear and mounds under the tube.

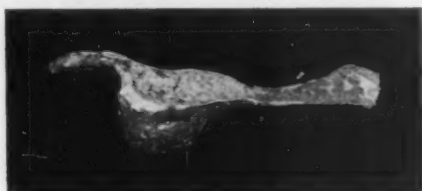


Figure 12.

The sheep. Superior and internal walls left side. The tube is on the right.

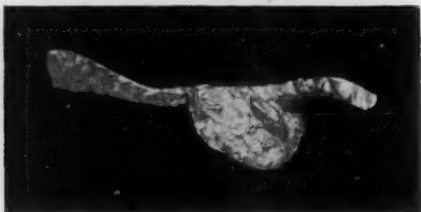


Figure 13.

The sheep. Inferior and external walls. Left side. The tube is on the left and its flare is shown.



Figure 14.

The dog. Infero-internal wall. Right side. The tube is on the left.
A. Guttural Pouch. B. Annulus Tympanicus.

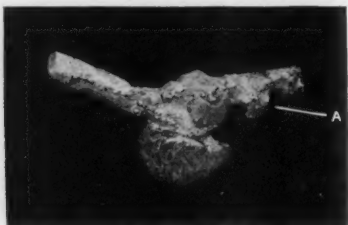


Figure 15.

The dog. Supero-external wall. Right side. The tube is on the right.
A. Guttural Pouch.



Figure 16.

The cat. Internal wall.
A. External Auditory Meatus. B. Annulus Tympanicus. C. Eustachian Tube.



Figure 17.

The rabbit. Internal wall. Left side. The tube is on the right.
A. Annulus Tympanicus.

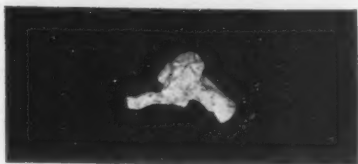


Figure 18.

The rabbit. External wall. Left side. The tube is on the left.



Figure 19.

Superior surface of right middle ear and tube of 27 cm. foetus. Hold the picture directly beneath the eye to obtain a correct conception of the superior surface. The tube takes origin from the external surface. The supero-inferior dimension, as can be seen from the upper part of the cut, is 2 to 3 mm.

A. Eustachian Tube. B. Oval Window. C. Promontory. D. Round Window.

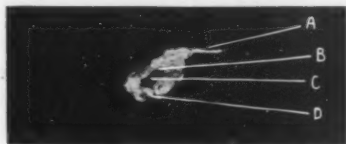


Figure 19.

Superior surface left middle ear and tube of 27 cm. foetus. Part of the external surface is visible in the upper part of the picture.

A. Eustachian Tube. B. Oval Window. C. Promontory. D. Round Window.

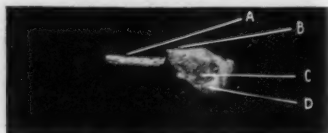


Figure 21.

Superior surface right middle ear and tube of 32 cm. fetus. The middle-ear lies horizontally, the promontory looking inferiorly. The infero-superior dimension is only 3 or 4 mm. The tube takes origin from the external part of the middle-ear, their inferior surfaces being on the same level, but the tube does not reach as far superiorly as the middle-ear.

A. Eustachian Tube. B. Canal for M. Tensor Tympani. C. Promontory. D. Round Window.



Figure 22.

Supero-internal surface left middle ear and tube of 32 cm. fetus. The surface of which this is an impression looks downwards and outwards.

A. Oval window. B. Round window. C. Canal for M. Tensor Tympani. D. Eustachian Tube. E. Promontory.

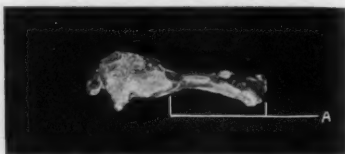


Figure 23.

Internal surface right middle ear and tube of infant at birth. The tube is funnel-shaped and a direct continuation of the middle ear.

A. Eustachian Tube.

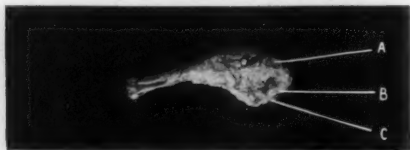


Figure 24.

Internal wall right middle ear and tube of infant at birth. The tube, while funnel-shaped, does not extend so entirely to the bottom of the middle ear as it does in the other fetus.

A. Oval Window. B. Round Window. C. Promontory.

meatus through the middle-ear and along the outer edge of the tube. A curette bent to this arc would pass through them. But as the curette has play antero-posteriorly in the meatus, practically its curvature can vary slightly from the real arc of curvature in all save the 3 cm. or so furthest away from the handle. Figure 31^a is a composite curve of the arc in fifteen specimens. The radius of the circle of which this is an arc is 2 cm. The maximum radius of the arcs is 2.5 cm., the minimum, 1.6 cm. Yankauer¹ uses a curette with a shank 7 cm. long, of which 2 cm. at the end form an arc of

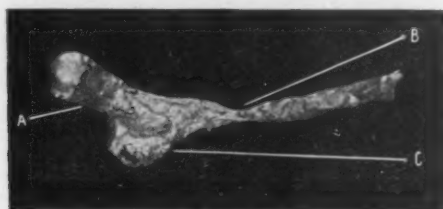


Figure 25.
External wall of adult. Right side.
A. External Auditory Meatus. B. Isthmus. C. Sharp Rise from Floor of Ear to Tube.

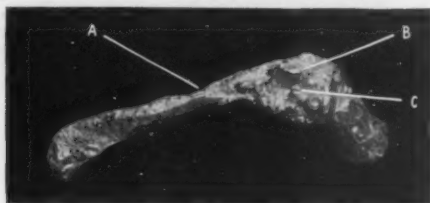


Figure 26.
Internal wall of adult. Right side.
A. Isthmus. B. Oval Window. C. Round Window.

a circle with a radius of 2.5 cm. Figure 31^b shows the curve of this curette.

The length of the tube has been given by most writers in absolute figures, by a few as varying within the limits of several figures. Von Troeltsch,² in 1861, gave 35 mm. as the length. These figures influenced many subsequent writers. Eitelberg,³ in 1884, was the first to allow for variance in the length, giving 36 to 44 mm. His figures are the highest I have found. Politzer⁴ with 34 to 36, and Gray⁵ with 35 to 40, are the only others that I noticed who allowed the length some latitude. From the measurements of the casts of ten adult human tubes I find the maximum length to be 44 mm., the minimum, 33 mm., and the average 37.8 mm.

RECAPITULATION AND SUMMARY.

In the six animals studied, the Eustachian tube is relatively short, of large caliber, and has no isthmus. It begins on a level with the floor of the middle-ear and thus provides most efficient drainage. In all the animals except the calf, the osseous external meatus is as long or longer than the Eustachian tube. This is most marked in the hog, in which it is one and one-half times as long as the tube.

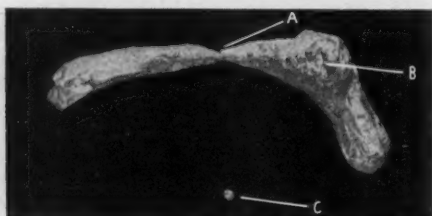


Figure 27.

Inferior wall of adult. Right side. A probe bent to conform to the curve along the lower edge of the picture from its right extremity to the isthmus serves as a model for a tube curette in this case.

A. Isthmus. B. Floor of Middle Ear. C. Center of Circle with Radius of 2 cm.

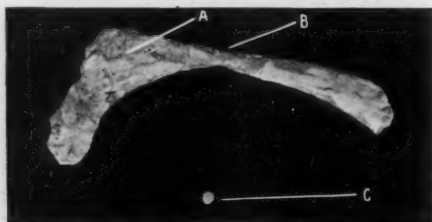


Figure 28.

Superior wall of adult. Right side. A probe bent to conform to the curve along the lower edge of the picture from the left extremity to the isthmus serves as a model for a tube curette in this case.

A. Epitympanum. B. Isthmus. C. Center of Circle with Radius of 2 cm. whose Arc Conforms to the Curvature of Proper Curette.

The pharyngeal orifice of the tube is a semi-circle in four of the six animals and is flush with the pharyngeal wall. The characteristic mound made by the cartilage of the Eustachian tube is lacking in all save the hog and it is very small in that animal. A mass of pneumatic cells mounds under the tube in the calf. A few such mastoid cells have been reported in the human. A guttural pouch, very small in comparison with those in the horse, comes off from the tube in the dog.

Leaving the comparative anatomy and coming to the description of the Eustachian tube in the human, the chief characteristics of the tube in the 27 cm. fetus are that it is short, relatively wide, without an isthmus, and, as the middle-ear is placed horizontally and is only 2 or 3 mm. in height, its vertical diameter is equal to the

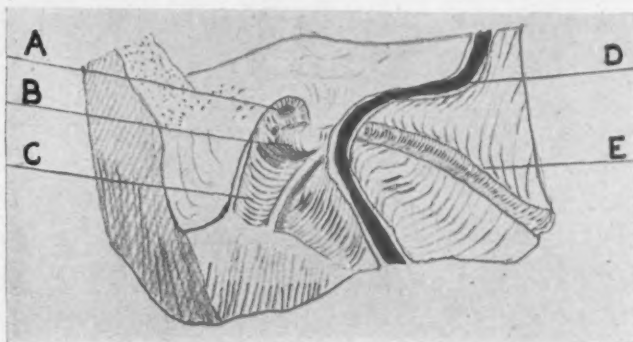


Figure 29.

The internal carotid exposed in its course in the temporal bone.

A. Oval Window. B. Promontory. C. Osseous External Auditory Meatus.
D. Internal Carotid. E. Eustachian Tube.

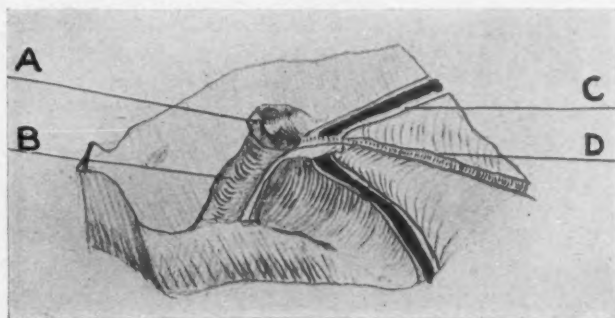


Figure 30.

The internal carotid exposed save where it passes beneath the tube.

A. Middle Ear. B. Osseous External Auditory Meatus. C. A. Internal Carotid. D. Eustachian Tube.

height of the middle-ear, and so it drains the middle-ear from the bottom and drains it perfectly as in animals. In the 32 cm. fetus the tube has the same characteristics but is, of course, longer and larger and, since the middle-ear, while remaining horizontal, has increased in height rather more than has the tube—though it still

provides drainage from the bottom—it is not quite so perfectly a direct continuation of the whole middle-ear as it is in the smaller fetus. The canal for the tensor tympani is beginning to show in this fetus. In the infant at birth the Eustachian tube is in most respects like the tube in the fetus. The chief difference is that in the two specimens before birth the tube leaves the middle-ear as a cylindrical tube and maintains its caliber throughout its length, whereas at birth the opening of the tube, though still beginning at the bottom of the tube, comes off like a funnel with its mouth toward the middle-ear instead of like a cylinder. The two are really inseparately merged and form a cone which slopes inward more sharply at its base.

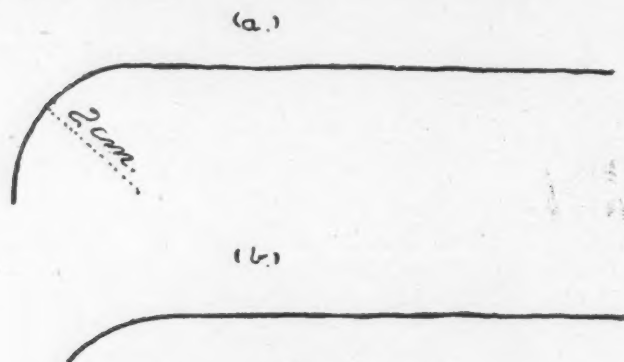


Figure 31.

A. Tracing of Author's Curette. B. Tracing of Yankauer's Curette.

The chief characteristic of the adult tube is that it leaves the middle-ear above the floor. The tube meets the anterior wall of the middle-ear at approximately a right angle and there is a jump-off of, on the average, 7 mm. from the floor of the tube to the floor of the middle-ear. This gives the casts a very characteristic appearance. The opening, while still funnel-shaped, is less so than at birth. The second and better known characteristic of the adult tube is that its lumen is constricted by an isthmus. In ten specimens the maximum distance from the isthmus to the pharyngeal orifice was 37 mm., the minimum, 17 mm., and the average 27.4 mm. The maximum length of ten tubes was 44 mm., the minimum 33 mm., and the average 37.8 mm. The curvature of the adult Eustachian tube as given by fifteen casts is that of an arc with a radius of 2 cm. The limits of variation are 2.5 and 1.6. Only two of the fifteen were curved on a radius of 2.5 cm. There is a marked

difference between curettes made on this curvature and those of Yankauer, which are curved on a radius of 2.5 cm. and, even allowing for the play afforded the instruments by the width of the external meatus, would be liable to endanger the thin internal wall of the tube in nine of my fifteen specimens on account of not being bent sharply enough. According to the specimens, a curette for the Eustachian tube should have a sharper curvature than those of Yankauer and of Yearsley,⁶ who uses a straight curette, in order to hug the external wall of the tube and so keep away from the thin bone of the internal wall which separates it from the carotid canal.

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Garden City Bank Building.

POLYP OF THE PHARYNGEAL MOUTH OF THE EUSTACHIAN TUBE.

BY C. M. BROWN, M. D., BUFFALO.

N. B., motorman, aged 56 years, came to me first November 23, 1910, complaining of increasing deafness and crackling in left ear for the past three weeks.

Examination of the membrana tympani showed retraction. A tuning-fork examination showed some interference with the sound-conducting apparatus. On post-nasal examination a polypus about the size of a swollen rice granule was found to be filling the pharyngeal mouth of the left tube. It was attached to the anterior superior border of the tube, and was removed under cocaine by means of a snare introduced through the inferior meatus of this side, the wire being placed about the polypus by observing through a Hays' pharyngoscope.

158 North Pearl Street.

TRANSILLUMINATION OF THE MASTOID.

BY HARRIS PEYTON MOSHER, M. D., BOSTON.

Trans-illumination of the mastoid has been mentioned and advocated in the literature for some years. Nothing very definite, however, has come of it. My attention was drawn to the subject by an article which appeared recently in the *Archiv fuer Laryngologie*, in which definite results were reported. I began with the procedure much in doubt as to its practical value and ended enthusiastic about it.

The purpose of this communication is to describe the apparatus for trans-illumination which I adopted after some experimenting, and to summarize the results of 125 cases in which trans-illumination was employed.

The apparatus is figured in the cut. It consists of an ear-speculum of medium size which is closed at both ends and has a window cut in the barrel on one side near the tip. The speculum is lighted by passing a light-carrier through the center so that the lamp,—the ordinary bronchoscopic pattern is used—comes opposite the window. There is an air-space about the lamp so that the speculum heats up very slowly. It may be left in the ear for a minute or more before it becomes hot. The trans-illumination is obtained in from fifteen to thirty seconds; consequently patients seldom complain of the heat. The barrel of the speculum can be detached from the collar which makes the base of the apparatus. In this way opportunity is afforded to clean the speculum and to insert a new lamp when necessary.

The current which runs the light is best obtained from four dry cells controlled by a small rheostat.

METHOD OF TRANS-ILLUMINATION:—The patient is taken into a dark room, the lamp adjusted to its maximum brilliancy and the speculum inserted into the ear with the window placed posteriorly. It is made to plug the meatus firmly so that no light comes through the auricle and when it has been snugly inserted the auricle of the ear is turned forward over the butt of the speculum. Two specula can be used at once if the examiner prefers. It is hard, however, to make both lights burn with equal brilliancy, and it is also difficult to hold both specula exactly in the axis of the canal. Unless this be done, the inner end of the speculum presses on the canal

and makes the patient flinch and disturbs or cuts short the examination.

In the beginning I compared the trans-illumination-findings with the findings of X-ray plates. Whenever the trans-illumination showed a cellular mastoid it was found that the plate showed the same thing. In a moderate number of cases the trans-illumination findings have been checked up by comparing them with the operation-findings. In two instances I have trans-illuminated the mastoid on the cadaver and found on dissection that the area of light corresponded to the cellular area.

Trans-illumination carried on with the speculum described above gives no results in infants and young children, because the light will not go through soft tissues. In infants and young children the bony canal is absent or small; therefore, until the bony canal is developed trans-illumination is of no use. When the soft tissues over the mastoid are infiltrated the light will not come through. On this account if there is edema behind the auricle, if there is a post-auricular abscess, or if there is inflammation of the soft tissues of the canal the light from the speculum is cut off and no zone appears behind the auricle. Trans-illumination is of most service in cellular mastoids. Naturally, also, trans-illumination is of the greatest use when one mastoid is normal.

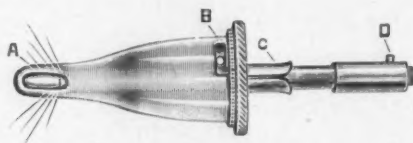
In using this procedure it is taken for granted,—the same as in the X-ray diagnosis of mastoid disease, and anatomical observations give good ground for this assumption—that the structure of the two mastoid processes is practically alike. Below and in tabular form is a summary of the findings of trans-illumination based on 125 cases.

1. Trans-illumination will show how cellular the mastoid process is.
2. The operative findings show that the zone of light obtained by trans-illumination in any given case corresponds to two-thirds of the area of the cellular structure. If, for example, the zone of light is half an inch wide, to take an exceptional case, the operation will end with a cavity three-quarters of an inch wide.
3. Trans-illumination gives a hint indirectly, as to the position of the lateral sinus. If it shows a markedly cellular mastoid on the well side the sinus is placed well behind the posterior wall of the canal.
4. In hospital cases with severe involvement of the middle-ear the mucous membrane of the entire mastoid process is involved from the start, so that the whole of the mastoid process becomes

dark except for a small crescentic rim of light in the tip and just behind the auricle. This little rim of light in the anterior upper part of the tip and behind the lower angle of the bowl of the auricle is the last to disappear. My present feeling is, that when this tip zone disappears, the whole mastoid process is disintegrated. The clouding of the mastoid process which occurs early in severe involvement of the middle-ear is probably due to congestion and lasts a long time. It begins to clear up between the third and fourth week, and may not wholly disappear until the fifth week.

5. The light given by trans-illumination will traverse granulations especially at the tip.

6. The light given by trans-illumination does not go through granulations so well if they are in the antrum because here they are more deeply placed than in the tip.



Mastoid transilluminator. (Mosher.)

A. Window in the tip of the speculum showing the position of the lamp.

B. Slot and pin showing the method by which the barrel of the speculum is attached to the collar which serves as the base of the speculum. The examiner holds the speculum by this collar.

C. Split cuff through which the light carrier runs and by which it is held.

D. Solid cuff on the end of the light carrier with pin for retaining the coupling which supports the wires from the battery.

7. In chronic cases trans-illumination shows how far the sclerosis due to the suppurative process has proceeded.

8. In chronic cases trans-illumination will show the extent of the involvement of the antrum.

9. In chronic catarrhal cases trans-illumination gives, in the majority of cases, a smaller zone of light on the side of the poorer ear.

10. In acute cases, in cellular mastoids where there is pus in the tip and no pus in the antrum, the tip is dark and the antrum lighter or wholly light. The writer has had three such cases.

11. Trans-illumination does not distinguish between an acutely congested mastoid and a mastoid filled with pus or cholesteatoma.

With the history of the case in mind, however, with the clinical signs accurately determined, the examiner who uses trans-illumination can make a much better judgment as to which of these three conditions be present than he ever could before.

After reflecting upon this table, the reader, I feel will agree that trans-illumination will do a good many things and do some things which nothing else as yet has accomplished. It has the great advantage that it is not costly. Each time it is tried the expense is not ten dollars or more. It can be used daily on the same case. The writer has found it to be of the greatest comfort to be able to watch by its aid the progress of acute cases. In one case with infection of the drum in the region of Schrapnell's membrane trans-illumination showed that only the antrum of the mastoid was involved. In two days the shadow began to clear. In another case of four weeks' standing with indefinite mastoid symptoms in a rounder who clamored for admission to the hospital in order to sleep off a prolonged drunk and who threatened trouble if the hospital authorities did not care for him because he said that he was an American citizen and that this was his birthright, trans-illumination showed that both mastoids were clear of shadow. In a third case, a girl with a long hospital history of a suppurating middle-ear, the naso-pharyngoscope showed pus coming from the Eustachian tube. The ossicles had been removed some years previously. Trans-illumination showed that the antrum was clear. Therefore, in spite of some mastoid pain and tenderness, the operative procedure was limited to curetting the Eustachian tube. The suppuration has nearly disappeared and the tenderness and pain have wholly gone. In a fourth case, a young girl was brought to the hospital with marked meningeal symptoms. She had had a middle-ear suppuration for two weeks. Trans-illumination showed a cellular mastoid with only a slight shadow over the antrum. On account of this finding, plus a negative lumbar puncture, an exploratory operation was delayed. The case cleared up without operation.

828 Beacon Street.

TREATMENT OF CICATRICAL STENOSIS OF THE LARYNX.*

BY EMIL MAYER, M. D., NEW YORK.

Cicatricial stenosis of the larynx may range from a single web to many bands of adhesion producing a more or less complete stenosis, and the disturbances to respiration are in direct accord with the amount of space left by their presence.

The dyspnea while practically constant, may be more severe upon exertion or while in an erect posture; in some it may be more severe on lying down, and in these the greatest relief is obtained when the patient is half reclining. Hoarseness to a greater or less degree is always present.

As the treatment of this affection varies with its cause, it becomes first of all necessary to ascertain the etiology of a given case. Among the causes of cicatricial stenosis of the larynx may be mentioned direct injury to the laryngeal mucous membrane occasioned by too much violence in the introduction of an instrument, chemical substance or following galvano-cautery. To this class may be added those cases of cicatricial contraction occasioned by the prolonged wearing of an intubation tube; the effect produced being first the wounding of the part from constant friction at the lower end of the tube, the formation of granulation tissue, resulting in adhesive bands.

Perichondritis of the larynx following typhoid fever may have a resulting cicatricial stenosis. Among the constitutional causes may be mentioned scleroma, lupus, lepra, tuberculosis and syphilis.

Any number of cases are recorded of the swallowing of concentrated lye, some of them producing in addition to the severe pharyngeal lesions, adhesive bands to the epiglottis and interior of the larynx. The writer has recorded a case of cicatricial stenosis of the larynx produced by gun-shot wound.

TREATMENT:—The amount of disturbance to respiration must be carefully considered at the very outset in mapping out the line of treatment to be followed.

If the dyspnea is very great, the patient cyanotic and weakened by his constant struggle, a tracheotomy will be primarily indicated. The next step is to restore the lumen of the larynx with the conse-

*Read before the Meeting of the American Academy of Ophthalmology and Oto-Laryngology, Indianapolis, September, 1911.

quent removal of the tracheotomy tube when that end is fully achieved.

To relieve this condition of stenosis is the task to which we now set ourselves and except in the more grave forms of disease we may do so with a degree of confidence of curing the patient ultimately; for we know of no organ in the body which is so tolerant to instrumentation and divulsive methods as the larynx. Our ingenuity is often taxed to the utmost to find a method applicable to a given case, as will be apparent a little later on when the methods of treatment are discussed.

A single web of adhesion may be incised by the introduction of a bulb-shaped instrument containing a concealed knife, so that by pushing a spring in the handle it may be cut through, following which the forcible distension of the parts by the introduction of a pair of laryngeal forceps past the obstruction and opening it fully will tear apart the cut edges of the band. The writer treated such a case successfully some years ago in association with his revered colleague, the late Dr. Morris J. Asch.

The method of Sargnon, laryngostomy, consists in splitting the larynx, removing the adhesive bands, introducing a piece of rubber tubing with packing firmly around it after a tracheotomy has been done; dressings must be changed frequently, these are painful and a long time elapses before the wound may be ultimately closed.

While the results obtained by this procedure are in the main satisfactory, the painfulness of the repeated dressings and the disagreeable formation of secretion about these dressings, render this form of treatment most objectionable, and it is only to be made use of when all other means have failed.

The writer has had the most gratifying successes in the treatment of these cases by the use of an intubation tube, and his method consists as follows: A preliminary tracheotomy, if the dyspnea warrants it, slow dilatation by means of Schroetter's tubes. These are long tubes of hard rubber, hollow in the center, which may be moulded into such shape as to permit of their introduction, and which are of varying width just as are the urethral sounds. These tubes are introduced through the narrow opening and are held in situ by the patient for ten minutes at a time, the largest possible size being used at each sitting; the tube must be lubricated and the larynx made tolerant by the use of a local anesthetic and they should be introduced three to four times a week. As soon as the stenosed larynx admits a full-sized Schroetter tube, we now proceed to intubate.

In practically every one of these patients an intubation tube is coughed out anywhere from a half hour to two hours or more after the introduction.

In such event the writer has made use of the ingenious device of John Rogers, Jr., of New York City, to whom great credit is due for his valuable suggestion. The full-sized, hard rubber intubation tube is introduced into the larynx. The tracheotomy wound is thoroughly anesthetized, an applicator is now heated to a white heat, and is thrust through the tracheotomy wound to the intubation tube; this is repeated several times; the heated metal makes distinct marks upon the intubation tube and the tube is then extracted, the tracheotomy tube being temporarily replaced.

The markings on the tube indicate a point in direct line with the tracheotomy opening and at this point a threaded opening is made by the instrument-maker, which permits the introduction of a screw-piece attachment through the tracheotomy wound, thus effectually preventing auto-extubation. It is not absolutely necessary that the tube with the Rogers' attachment should be of hard rubber, as it may be made of metal. The tube is now worn constantly for four or six weeks, at the end of which time it is removed and in all probability for all time. The writer has had occasion to make use of this method a number of times and always with most satisfactory results.

The ordinary intubation-apparatus consists of the tube and introducer, which, when applied, effectually cuts off all air, a matter of no great moment in cases where rapid intubation is possible. In these cases of stenosis, however, slow intubation becomes necessary, and the writer has devised an apparatus to meet this emergency.

It consists of a hollow handle which, while holding the intubation-tube in position by permitting the patient to breathe through the tube and handle, enables us to take as much time as we may desire to introduce the tube.

The addition of the bronchoscope to our armamentarium enables us to treat this class of unfortunates by permitting us to remove obstructions under our direct vision and also to distend the parts. The tubes used are either those of Jackson with illumination at the lower end, those of Killian with the head-light, or with light in the hand as by the instruments of Kahler or Bruening. No little credit is due to these colleagues who have by their ingenuity, perseverance and scientific work given the fruits of their labors so freely to medicine in general, and to laryngology in particular.

The writer has already recorded the successful use of the bronchoscope as a dilator in a case of scleroma of the trachea, where without its use a tracheotomy would long since have become an absolute necessity.

The limitation of time placed upon me will not permit my going extensively into a detailed description of cases nor even the more minute description of the treatment of the various forms of stenoses due to constitutional disease, but as the vast majority of cases of laryngeal stenosis are due to syphilis, this subject will receive our attention in the concluding portion of this paper.

Until two years ago we should have concluded with the statement that our syphilitic patients must receive the usual mercurial inunctions, injections and internal treatment.

As in other fields of medicine, the remedy of Ehrlich, now known as salvarsan, has been used in the treatment of cicatricial stenosis of the larynx. Those of our colleagues who have had early opportunity to procure this remedy, have already presented their results, as the recent literature indicates.

Speaking of the treatment of these affections by salvarsan, Professor Gerber, in the *Archiv fuer Laryngologie*, Vol. 24, 1910, p. 366, quotes a case of cicatricial stenosis of the larynx in a woman, 63 years old. She gave no luetic history, and stated that she began to be short of breath two years previously, and believed that this was caused by a piece of bone that stuck in her throat. An examination then made, showed hard swollen and thick tissue bridging the anterior and posterior portions of the larynx, so that there was a funnel-shaped opening, the lower end of which was no larger than a pea. She was much improved under mercurials, iodide, and the use of Schroetter's and O'Dwyer's tubes.

In October, 1910, she returned with increased dyspnea. Wassermann positive; December 15, received her first injection; four days later the patient breathed freely and well. The whole cicatricial funnel was gone and the trachea could be seen, and one month later the note is made with a proper exclamation point: "normal larynx!"

Professor Chiari records his observations in the *Berliner klinische Wochenschrift*, No. 35, August, 1911, p. 1587. A total of fifteen cases, seven of them laryngeal, of the latter, five were cured, one only in so far that the rapidly advancing necrosis was stopped.

Henke, *Muenchener medizinische Wochenschrift*, No. 31, 1911, p. 1670, has an article on "Salvarsan in the Treatment of Laryngeal Syphilis." He calls attention to continuous inroads of syphilis,

often in spite of most energetic anti-syphilitic treatment, and sounds a note of warning against the use of iodide of potassium because of the danger of producing a laryngeal edema. In addition to the case of Prof. Gerber, he cites a second instance of a female, aged 27, who was infected three years previously. She had ulcers on the pharynx and on the tonsil, the epiglottis was greatly thickened and red, the right ary-epiglottic fold, false vocal cord all included in a large gummatous ulcer with much infiltration, narrowing the lumen of the larynx, producing great dyspnea. Wassermann positive. November 8, she received her first injection of salvarsan. On November 9, the pain in deglutition and the dyspnea were remarkably improved, the stenosis greatly diminished, and in ten days not a sign of the disease was left. Six months later there was no recurrence.

A number of other writers have presented contributions showing the efficacy of this remedy in affections of the mouth and larynx. The manner of its use and some of the objections to it make another story.

You will permit me to revert for a moment to Prof. Gerber's article from which I have already quoted: "We began these injections really without any expectation, and after four days the dyspnea of years had disappeared and the cicatricial bands narrowing the larynx to the greatest degree were no longer visible and we had before us a normal glottis. I must admit that this made the impression on myself and my assistants as being simply marvelous."

We are usually self-contained, having lived long enough to see remedies that were to do great things utterly fail, hope has been blasted time and again, and yet when we see some of the marvels that are performed by the administration of this drug, we too become amazed and filled with due admiration and pride at the achievement of its originator, Paul Ehrlich, in conferring this inestimable boon upon these doubly unfortunate individuals.

40 East Forty-First Street.

Primary Infantile Mastoiditis. M. ARTELLI. *Arch. ital. di Otol., Rinol. e Laringol.*, March, 1911.

As a result of two personal observations, Artelli believes himself authorized to conclude that in the antrum and antro-mastoid region, fatal primary processes may develop.

Ed.

TREATMENT OF FOREIGN BODIES IN THE ESOPHAGUS.*

BY E. FLETCHER INGALS, M. D., CHICAGO.

Although the esophagoscope has greatly aided us in the management of impacted foreign bodies in the esophagus, it has not and cannot entirely supplant the older methods.

Many physicians cannot spend the time necessary to become familiar with the instruments and therefore cannot afford to possess the necessary appliances for the use of this new method; and even if they could, their lack of experience would often render esophagoscopy unsatisfactory. Besides there are not a few cases in which the time-honored methods of operation are simpler, easier and quite as effective as esophagoscopy.

For the removal or dislodgment of common pins and small fish bones from the esophagus, there is no instrument more generally useful and effective than the old bristle bougie which can be employed with almost perfect safety. For the removal of coins and buttons from the esophagus often nothing is better than the old bent esophageal forceps or a straight, smooth, blunt-pointed and toothless No. 8 hemostat.

As a part of the brief paper that I shall present this evening, I have selected from among my case-records a few merely to illustrate some of the principal features in the treatment that have been impressed upon me in this work, but I will not tire you by routine histories.

L. A. N., aged 24, came to my office stating that he had swallowed a pin a few hours previously and that he felt the point a short distance below the larynx. He had swallowed nothing since the accident. No radiograph was taken. I passed a bristle bougie well down the esophagus and withdrew it and repeated the procedure two or three times, but with negative results. I then passed a large smooth olivary bougie but could feel nothing. I then assured him that I thought he would have no further trouble, which proved to be the case. In most of these cases the foreign body has passed into the stomach before the patient reaches the specialist. Although

*Read before the Meeting of the Chicago Laryngological and Otological Society, November 21, 1911.

such patients are usually obsessed with the idea that the foreign body is actually in the esophagus, I have never resorted to the ruse, recommended by some, of showing a pin which I claimed to have removed; but when I have failed to get the pin or fish bone, have told them that I thought the sticking sensation was due wholly to a wound. When I have shown them the working of the instrument which had been scraped two or three times up the esophagus they have been satisfied. So far as I know, I have made no mistakes in this way, although I think the pin or fish bone has not been obtained in more than 25 or 30 per cent of all the cases.

I might cite numerous cases of small fish bones or pins lodged in the esophagus, but these are so common that case records would not be of interest. In all of these, excepting where the foreign body has been fixed in the fauces or in the larynx, or pharynx, or in the opening of the esophagus, I have found the bristle bougie more generally useful for their removal than the esophagoscope and forceps; and for one who has not had experience with the latter method, the bristle bougie would, without doubt, be the best. The patient's sensations cannot be considered a reliable guide as to whether or not such foreign bodies as these have been removed; indeed in most cases the patient will believe that he feels the pricking of the bone or pin for a day or two after it has been dislodged. Therefore, when the bristle bougie has been passed down and up the esophagus two or three times, the operator need not feel disturbed if he has not secured the offending body or if the patient still thinks he feels it at the original site. When we consider how easily even large bodies may be overlooked in the esophagus, we will realize how difficult it may be to see a pin or a nearly transparent fish bone.

C. M., a child 4 years of age, swallowed a nickel 2 cm. in diameter two weeks before I saw it. Since the accident, it had regurgitated all solid food but took liquids without trouble. At the time she entered the hospital, the temperature was 99.2°, pulse 120. Under chloroform anesthesia I passed the esophagoscope even to the cardiac orifice, but had to search nearly three quarters of an hour before I was able to find the coin, though it was located only a short distance below the cricoid cartilage. The instrument passed by the coin repeatedly without touching or exposing it, apparently because of a fold of edematous tissue. As soon as I could see a small portion of the edge of

the coin, I had no further difficulty in its removal. The child made an uneventful recovery.

Formerly, foreign bodies that could not be extracted were often crowded into the stomach and even now if an esophagoscopist were not at hand this procedure would be proper under some conditions especially when the body is not very large or rough and has passed down into the mediastinal portion of the esophagus. As an illustration, I may mention the case of a boy who swallowed a tin whistle that had lodged in the lower part of the esophagus. He was brought to me years before esophagoscopes were attainable, and before the development of small electric lights made them especially serviceable, and long before we recognized the possibility of using a long straight inflexible forceps in the esophagus. I could not secure the foreign body by any attainable instrument and a thoracotomy would have meant almost certain death. With an esophageal bougie I crowded the whistle down a few millimeters each day for several days until it finally passed into the stomach. The boy is now a man and has never had any further trouble from the whistle. However, crowding a foreign body from the esophagus into the stomach should not be attempted at the present day if it is possible to secure the assistance of a competent esophagoscopist.

A boy, 6 years of age, had swallowed a piece of tin a few hours before he was brought to me. The parents had only the child's description of it. The radiograph showed a round piece of tin about a cm. in diameter located in the mesial line just above the level of the clavicles with its flat surface forward. A lateral view gave a shadow just in front of the spine about 8 mm. thick by 2 cm. long. This was before the days of bronchoscopy. I gave chloroform and passed the bent esophageal forceps with which I tried to grasp the foreign body but failed to secure it. I tried also a metallic tube forceps with no better results. I then passed a Maw's large esophageal bougie which went easily into the stomach, but I could not feel the foreign body. Another radiograph was then taken which showed the body lodged in the stomach. The subsequent history was not obtained.

E. S., an uneducated foreigner who had not been long in the country was brought to me about a month after having swallowed a sharp triangular piece of tin 2.7 mm. in length on

each side. I learned that the night after swallowing it his throat had been very sore and that subsequently he had been unable to swallow solids but had taken fluids without great difficulty. He complained of a sticking sensation just back of the larynx. A large esophageal bougie was stopped by the foreign body 20 cm. below the front teeth. I did not obtain a radiograph but feeling confident of the position of the foreign body, without an anesthetic, I passed a bent esophageal forceps with the blades antero-posteriorly. These were opened widely but gently, and carefully introduced past the body and closed upon it at the first effort. The body was withdrawn without difficulty. It must have produced some injury to the mouth of the esophagus, but the patient did not report again and therefore I concluded that he had made a good recovery.

Where coins or similarly shaped bodies have lodged in the esophagus if their position can be ascertained by means of an esophageal bougie or a skiagraph, either the bent esophageal forceps or an 8 to 12 inch hemostat may often be successfully employed in their removal. In such cases the exact measurement of the distance from the teeth to the foreign body should be taken, and then with the head in the proper position, the forceps should be introduced down to the immediate vicinity of the body. The blades should then be opened widely antero-posteriorly but not too forcibly and then pushed gently downward about an inch when they may be closed with great assurance of grasping the offending body. Success may often be attained in this way, even where there is a large amount of edema of the esophagus, and in some cases where the esophagoscope might pass by the foreign body without the operator being able to discover it.

H. W. R. L. a child aged 2 years and 2 months was brought to me a week after having swallowed a penny. It had been unable to eat any solid foods since that time. It had some choking upon getting excited. The history stated that after the accident the child sometimes could not swallow solid foods at all but at other times could. The X-ray showed the coin in the esophagus with the flat surfaces antero-posteriorly opposite the second dorsal vertebra. This was before I had seen an esophagoscope. I passed a long bent forceps down to the region of the foreign body, then opened the blades antero-posteriorly and pushed it gently down an inch and a half when

it closed firmly upon the penny which was removed without difficulty.

In a subsequent case I searched diligently for a coin with the esophagoscope, but could not find it and then using an esophageal forceps as in this case removed the foreign body easily.

When coins have been impacted in the esophagus for some time with much edema and swelling, the folds of the esophagus are liable to cover them entirely. It is probable that in the majority of cases where the laryngologist has not been able to find a coin or button with the esophagoscope and has concluded that it has ulcerated through the esophagus, it was simply hidden in this way.

The esophagoscope appears to have been first used by Kussmaul in 1868, next by Mikulicz in 1881, and it was brought to a fair stage of perfection by v. Hacker in 1889; but the means of illumination were not then very satisfactory and it is probably for this reason, that although several operators presented papers on esophagoscopy during the next few years, the operation did not meet with great favor until it was taken up by laryngologists subsequent to Kirstein's publication in 1895 and following Gustav Killian's epoch-making work on laryngo-tracheo-bronchoscopy and esophagoscopy from 1896 to 1899. Since then the management of foreign bodies through the esophagoscope has become an established operation of very great value, which has been adopted by many laryngologists and by some internists who are specializing on diseases of the stomach. It is significant that most of this work has been done by laryngologists although they cannot claim credit for the discovery and early development of esophagoscopy.

Before attempting to pass an esophagoscope, the laryngopharynx should be thoroughly examined with a laryngeal speculum. In practicing esophagoscopy it is desirable first to locate the position of the body by a bougie or radiograph; then an instrument of proper length and of a size as large as can be comfortably introduced should be selected which should be fitted with an obturator which will allow it to pass into the esophagus smoothly and without injuring the soft tissues. Good assistants will generally be needed, one to hold the head firmly, another to attend to the anesthetic if one be used, and a couple of nurses to furnish the other desirable assistance. It is best to place the patient upon the back with his shoulders

drawn from 4 to 6 inches beyond the end of the table, the head bent backward and supported firmly by the first assistant. Dr. Jackson prefers having this assistant sit at the patient's right upon a high stool with his left foot resting upon a lower stool which will bring his left knee up to about the desired height of the patient's head. The assistant's right arm is passed under the patient's neck and his hand brought up on the left side to hold the gag, which is an essential instrument. The left hand grasps the vertex and holds the head firmly. I have been accustomed to having the assistant upon the patient's left side, the anesthetist upon the right side, and someone else to hold the gag and possibly the patient's body.

Unless it has become inflamed the esophagus is not very sensitive, therefore, if the patient has fairly good grit or if he is so small that he may be held quietly, it may be unnecessary to use any anesthetic. Where an anesthetic becomes necessary, cocain from 10 to 20 per cent in a 1- or 2-4000 solution of suprarenalin will often be found sufficient; but cocain is too dangerous to be employed for this operation in any considerable quantity in children.

K. H., a girl 14 years of age, swallowed a sand burr the day before she was brought to me. She felt that it had lodged in the upper part of the esophagus on the right side. It caused much pain when she attempted to swallow. I applied cocain and passed a bronchoscope, 7 mm. in diameter with an internal light, well down the esophagus and slowly withdrew it searching carefully in every direction but was unable to see the foreign body. I then took a larger instrument which would distend the esophagus and passing it carefully found the burr 15 cm. below the upper teeth. I removed it with a Killian forceps without difficulty.

In short operations in children under 4 or 5 years of age, who are not too excitable, many times no anesthetic is needed; but in children who are frightened or very nervous, or in adults who are not able to stand discomfort, and in all cases where spasm of the esophagus occurs, a general anesthetic will not only be of great help to the operator, but it will save the patient much discomfort and will render the operation less dangerous. Ether is without doubt the safest anesthetic for the purpose, though chloroform has several apparent advantages. I formerly used chloroform with children, and think every one who

has employed it would recognize its advantages provided it were as safe as ether; but as it is not, the operator cannot use it without assuming grave responsibility. It should not be forgotten, however, that complete anesthesia is especially dangerous when there is much dyspnea. In passing an esophagoscope under such circumstances great care should be taken not to make any unnecessary pressure on the trachea by carrying the instrument too far forward.

The esophagoscope may be introduced by the sense of touch guided by the forefinger of the left hand, or it may be introduced by sight with the aid of a laryngeal speculum (tube spatula). There are several instruments that may be employed for this purpose—Jackson's, Killian's and my own are most familiar to me and all possess the requisite qualities. When the end of the instrument has been passed into the mouth of the esophagus, the patient's head should be brought a little farther forward so that it may follow the natural course of the organ without pressing too greatly upon the trachea.

The esophagoscope may be illuminated either by the internal or by the external light, but it should not be forgotten that dynamo-currents are dangerous because of the possibility of short circuiting; therefore, some form of battery of low voltage should be employed. A battery has been devised by Jackson which leaves little to be desired in this direction. With his battery the small internal electric bulbs or the larger Bruenings or Kirstein lamps may be highly illuminated without danger to either patient or operator.

As an illustration of the ease with which foreign bodies may sometimes be removed, I may cite the case of a five year old child that had swallowed a nickel, 2 cm. in diameter 4 days before he was sent to me. The X-ray showed the foreign body lodged back of the cricoid cartilage with its flat surfaces antero-posteriorly. Under chloroform anesthesia I introduced a bronchoscope with an internal lamp, quickly found the coin and withdrew it without difficulty with an ordinary tube forceps. The child was discharged the next day.

The principal difficulties experienced by operators in passing the esophagoscope come from incorrect position of the patient's head and the direction of the instrument, though sometimes spasm of the muscles of the pharynx or esophagus cause a serious obstacle. The correct position of the patient's body and

head and the proper direction of the instrument cannot be better described than in Chevalier Jackson's excellent monograph. The essentials are that at first the head be bent backward, so as to straighten the cervical curvature and bring the axis of the oral cavity parallel with that of the esophagus; but as soon as the mouth of the esophagus has been passed the head must be brought slightly forward so that the instrument is directed downward and backward at an angle of about ten degrees. An obturator that supplies a smooth conical end should always be used unless the instrument is passed by sight. Spasms should be relieved by deep anesthesia.

A few years ago this operation was said to be devoid of all danger but we now know that even with experienced operators fatalities may occur and we have reason to believe that with others there may be a large percentage of mortality. In a recent publication Jackson states that in a series of 616 esophagoscopies for foreign bodies which he had collected, it was shown that nineteen deaths had occurred or a mortality of three per cent; but as he very justly states, this probably indicates the mortality of skillful work in large clinics, and he feels that the deaths at the hands of unskillful operators must be many times greater than this; indeed he had confidential correspondence from esophagoscopists giving accounts of eight other deaths. If the experienced operator has a successful case he reports it quickly but if another case terminates fatally, he has nothing to say. Indeed, excepting in hospital service, for obvious reasons, even among fair men, very few of the fatal cases can be reported. He regards the esophagoscope in the hands of rough, careless or inexperienced physicians as a dangerous and often fatal instrument. Yet, the traumatism I have found after some unsuccessful attempts at removal of foreign bodies leads me to think that possibly any other instrument, excepting perhaps the bristle bougie, in similar hands might be quite as dangerous or even more so. It has appeared to me that there is a large element of danger in too prolonged operations and I think that an hour ought to be the limit. I have seen only two cases that illustrate the dangers of impaction and removal of foreign bodies from the esophagus.

The first, a child aged 2 years, was brought to me four days after having swallowed a silver quarter 2.4 cm. in diameter. It was a weak rachitic child, with very large head and prominent

veins, but no other bodily deformity. I found a temperature of 100° and pulse, 110. The blood examination showed 23650 leucocytes. The child had been unable to take any food since the accident and consequently was very weak. A radiograph showed that the coin was lodged in the esophagus just above the level of the clavicles, its flat surfaces antero-posteriorly, the position in which flat bodies practically always lodge in the esophagus. I was unable to operate until the following day when under chloroform anesthesia I passed an esophagoscope and soon found the coin which was removed without difficulty. The temperature steadily increased from the time of the operation for about 36 hours when it reached 108° F. shortly before death. No post-mortem could be obtained. This child had been 5 days without any nourishment before the foreign body was removed and from the temperature and leucocytosis it seems fair to conclude that the operation did not hasten the fatal result. I am confident that no injury was done during the operation.

I saw a somewhat similar case with Dr. Friedberg in which a child about 2 years of age had swallowed a coin 2.3 cm. in diameter. It had been in the esophagus eleven days when I assisted Dr. Friedberg in its removal. Considerable injury had been done to the esophagus by efforts at its extraction before Dr. Friedberg saw the patient. The radiograph showed it located a little above the line of the clavicles a little to the right of the median line. We passed an esophagoscope even the whole length of the esophagus and searched critically and repeatedly for the foreign body, but were unable to see or feel it. Finally, when esophagoscopy had proven fruitless, a blunt-pointed, 8-inch hemostat was passed into the esophagus until it neared the position of the coin when it was turned and the blades carefully opened antero-posteriorly. It was then pushed gently down about an inch, and closed on the edge of the coin, which was removed without further difficulty. The temperature had been from 100° to 102.2° before the operation, subsequently it ran from 100° to 104° until the child's death four days after the operation. No post-mortem was obtained.

Notwithstanding the difficulties and dangers attending esophagoscopy for the removal of foreign bodies, the history of this operation for the last few years leaves no doubt that the aid of an experienced laryngologist should be secured in all

cases where foreign bodies have become impacted in the esophagus. Where it is impossible to obtain the help of a skillful esophagoscopist the methods which I have already referred to, such as removal by bent or straight forceps, without the aid of illumination, or pushing the foreign body into the stomach, are sometimes justifiable. In every instance where possible, esophagoscopy should be employed instead of the much more dangerous esophagotomy.

H. C., a child $2\frac{1}{2}$ years of age, had swallowed a fleur-de-lis chatelaine pin six days previously which had very rough sides and angles and measured 2.8 cm. in length by 2.1 cm. in breadth. The radiograph showed it lodged in the esophagus just above the level of the clavicles with the flattened surfaces antero-posteriorly. The child had been unable to take any solids but swallowed liquids freely. Under chloroform with the esophagoscope after a great deal of difficulty, I succeeded in seeing a very small part of the end of the pin which I grasped with forceps and removed. The patient made an uneventful recovery.

T. J. E., aged 60, was brought to me three days after having swallowed a chicken bone having two ends measuring 2.5 cm. and 3.6 cm. respectively in length, joined at an angle of about 50 degrees. This patient had not been able to swallow even a drop of water since the accident. Three physicians had made persistent efforts to remove it, but without success. I gave the patient ether and upon passing an esophageal tube found that a good deal of injury had been done about the mouth of the esophagus which so altered the appearance of the parts that it was difficult to determine the conditions and it was impossible to see the foreign body. After a prolonged search I passed a large bronchoscope down the esophagus to the cardiac orifice of the stomach and I searched every portion with the greatest care, but was unable to see any foreign body. I then introduced a large olivary bougie 16 mm. in diameter which passed without obstruction into the stomach and encountered nothing that gave a sensation of a foreign body. Upon withdrawing it carefully, however, I noticed a slight sensation which I attributed to the foreign body near the mouth of the esophagus. I then introduced a large tube and passing it gently and slowly into the upper portion of the esophagus worked it down and up until I finally discovered one edge of the bone lying laterally across the esophagus between two folds of mucous membrane.

I seized it with forceps and though it was firmly impacted, withdrew it without difficulty. The patient made a speedy recovery.

An operator must not too readily conclude that something which, to him, appears unnatural is the wound through which a coin or button that cannot be found has made its way through the esophageal wall, for in the great majority of cases it would be very much more likely that such a foreign body was hidden by a fold of edematous tissue.

The very great mortality from external operations and the almost hopeless chance for success from thoracotomy should encourage the esophagoscopist to adopt every reasonable measure to discover and remove anything impacted in this organ. Where large or rough bodies have become fixed in the lower portion of the esophagus, they should be broken up in some way and removed piecemeal. The greatest care always being taken not to inflict injury.

After the removal of a foreign body from the esophagus if there is reason to believe that any necrosis has occurred, or that any injury has been done, the patient should be nourished by enemas for a few days, and then liquid diet should be given until the surgeon feels confident that the parts have sufficiently healed to allow the ingestion of solid food. For relief of inflammation and as an application to injuries, I recommend the administration of a powder, every three or four hours, consisting, for an adult, of 20 grains of subnitrate of bismuth and 20 grains of calcined magnesia. This should be moistened with a few drops of water and swallowed in this pasty condition with a hope of smearing it over the whole surface. The magnesia is added to the powder for the sake of preventing the constipating effects of the bismuth.

15 East Washington Street.

Pre-epiglottic Phlegmonous Tonsillitis. SEIFERT. *Rev. hebdomadaire de Laryngol. d'Otol. et de Rhinol.*, Jan. 7, 1911.

Seifert reports a severe case of abscess of the lingual tonsil, which was drained by incision. Hemorrhage was stilled by tamponade applied with the finger.

Ed.

SOME ESOPHAGEAL CASES.*

BY STANTON A. FRIEDBERG, M. D., CHICAGO.

In a paper read before this society last year, in which I reported the removal of foreign bodies by bronchoscopy and esophagoscopy, (*Illinois Medical Journal*, March, 1911), one case was cited in which the foreign body was removed from the esophagus by a method in which only the direct speculum and a suitable forceps was used. To this case I wish to add two others, in which the same procedure was carried out, and also to describe several other cases, interesting from various standpoints.

As is well known, the location of foreign bodies, which become lodged in the esophagus of infants or young children, is usually at some point between the cricoid cartilage and the plane of the supra-clavicular notch. This applies more particularly to coins, round whistles and bodies of similar shape. A circumstance that many have experienced and have called attention to, is the ease with which the esophagoscope may be passed in the case of a foreign body in the esophagus without revealing its location. This is due to the fact that the end of the esophagus, in its introduction, impinges on the posterior or vertebral wall of the esophagus, especially at its upper part. In doing so, it may easily pass behind lying under the ledge of the cricoid and around it forward to the less resisting tracheo-esophageal wall. In withdrawing the esophagoscope and making a careful search from below upward, it may usually be revealed, provided it is not impacted and surrounded, or covered by edematous mucous membrane. This latter adds immeasurably to the difficulties of the operation, and is seen many times after ill-advised efforts have been made either to remove the body blindly, or push it downward into the stomach.

Case 1. The first case in which I removed the foreign body by means of the direct speculum, was that of a girl, 1 year of age, who had swallowed a penny. In this case I easily passed the esophagoscope without any anesthetic being given. This examination was brief, and did not result in my finding the coin. The next day, under ether anesthesia, I introduced the Ingals speculum into the mouth of the esophagus, and to my surprise I could see

*Read before the Meeting of the Chicago Laryngological and Otological Society, November 21, 1911.

the upper edge of the penny approximately one-half inch below the end of the speculum. The esophagus was distended from side to side. The coin was easily removed by means of a long urethral alligator forceps. Recovery was uneventful.

Case 2. A. P., 17 months old, referred by Dr. D. D. Lewis, with a history of having swallowed a penny four days previously. Since that time the difficulty in swallowing had increased. The skiagraph showed the coin in the usual location and upright position. The child was placed on the table, the direct speculum introduced into the mouth of the esophagus, and the coin seen a short distance below the end of the speculum. It was removed with forceps without much difficulty. No anesthetic was used in this case. The patient lived out of the city, and as its condition was good the parents were allowed to take the child home.

Case 3. H. K., 5 years old, referred by Dr. William L. Ballenger. Four days before she had placed a tin whistle in her mouth, and had attempted to swallow some water. In doing so the whistle became lodged in the throat. She complained only of a little pain in the throat during the day, but at night she refused to eat. The next day conditions were about the same. On the fourth day she was able to drink and retain the first cup of water she had had since the accident, and in addition ate some plums. The pain and sensation of a foreign body in the throat persisted, together with pain in the posterior cervical region. She was brought to the hospital on this day. The skiagraph revealed the whistle in the upper part of the esophagus. On examination with the direct speculum, the whistle was easily found, but the resistance offered to its removal was so great that it was judged best to give ether. A small amount was administered, and the foreign body removed. The whistle measured 2.2 cm. in diameter. Recovery was uneventful. Particular attention was paid in this case to see if there was any laryngeal disturbance, owing to the pressure exerted upon the arytenoid and cricoid cartilages by the speculum. Beyond a slight hoarseness, which lasted a few hours, there was no ill effect. In these three patients the removal of the foreign body was brought about with such comparative ease that I wish to call attention to the method, as it seems to me to be a simpler procedure than the use of the endoscope, especially in the cases which I have specified.

In addition to these cases, several others, more or less typical in their class, may be cited, on account of interesting features.

Case 4. M. C., age 30, was admitted to the service of Dr. Joseph C. Beck July 1, who kindly referred him to me. He gave this history: While eating soup the night before, he felt a choking sensation, as if a bone had become lodged on the right side of the throat. He induced vomiting without bringing about its removal. Later he went to a physician, whom he stated felt the bone and worked for two and one-half hours to remove it. He came to the hospital the next morning. Examination showed a good deal of congestion and edema of the pharynx, but the bone was not visible. Operation was deferred until a skiagraph could be taken. The patient suffered a great deal of pain, and was unable to swallow either fluids or solids. I saw him on July 4, and under local anesthesia I introduced the direct speculum, and found great edema, involving the right lower half of the pharynx, epiglottis and ary-epiglottic fold. In spite of the profuse use of cocaine, so much pain was caused in attempting to pass the esophagoscope that ether had to be given. The whole length of the esophagus was examined, but the bone was not found. The patient was put to bed, cold compresses applied to the neck, and an adrenalin spray ordered for the pharynx and larynx. He was kept on this treatment for several days to reduce the swelling in the throat. He improved somewhat, and though still suffering pain and discomfort, was able to take liquid nourishment. Examination of the throat was then made by the indirect method. The swelling and edema had subsided greatly. A small whitish area was seen in the pyriform fossa. The throat was anesthetized, and a Mackenzie laryngeal forceps was introduced, and the folds of edematous mucous membrane separated. The bone could then be seen, and although resisting greatly, was removed with the forceps. Its measurements were 2.5 cm. by 1.5 cm. Relief to the patient was practically immediate, and he was discharged from the hospital the next day. This case is cited to call attention to the necessity of complete and thorough examination of the pyriform fossae in cases of suspected foreign bodies, in which pain is localized to the upper part of the esophagus. The skiagraphic picture appeared to be uncertain and indefinite. A picture taken subsequent to the operation revealed the error in interpretation.

Case 5. The patient, referred by Dr. Ballenger, was a child about 14 months old. The father brought the child directly from the train to the hospital. The history in brief was that the child had swallowed some small metal toy. At first the father refused

to allow anything to be done at all. Finally he consented to allow an examination to be made, but gave no opportunity to have a skiagraph taken. Under ether the esophagoscope was passed, and after much search the foreign body was found. I managed to grasp it with forceps, but in attempting to remove it the resistance was so great that I feared that I might rupture the esophagus. The tube and forceps were taken out, and a larger tube inserted. I searched for a long time, but could not find it again. Whether it was dislodged and pushed down into the stomach, I do not know. The child was taken out of the hospital before it had recovered from the anesthetic, so that no opportunity was given for further examination. In spite of the failure in this case, a valuable lesson was learned, and that is, if one is to undertake these cases he should have the fullest co-operation on the part of the patient, or its parents. Skiagraphs should be obtained, careful physical examinations made, the patient should be properly prepared, and one must be assured that the needful instruments are at hand. At best, the work is hard enough, without the additional handicap of uncertainty and inefficient or insufficient preparation.

Case 6. J. J., about 4 years of age, some months previously had swallowed lye. He was admitted to the surgical service at the Cook County Hospital in such condition that he could only with great difficulty swallow fluids. A gastrostomy was performed, and an unsuccessful attempt was made to pass a bougie from below and also above. Later he was transferred to my service. Under ether a Jackson endoscope was introduced, the site of the stricture found and dilated through the tube with Maw bougies up to No. 11. Dilatation with the ordinary esophageal bougies was then carried out for several weeks without any difficulty. There was no trouble in swallowing fluids and softly prepared foods. His parents took him home and discontinued treatments. He was returned to the hospital in a few weeks with the history of a recurrent increased difficulty in swallowing. He was again anesthetized, and the stricture dilated through the tube. The ordinary esophageal dilatation was then carried on with so great improvement that he was soon able to swallow solid food without difficulty. Shortly thereafter he was attacked by scarlet fever, and was transferred to the contagious hospital. I did not see him after this time. This case is not cited as a cure, as it is well-known that a long period of treatment has to ensue before we can consider such cases cured. It is cited to show the great practical value of the endoscope in re-

vealing the location of the stricture, and the facility with which the primary dilatation was carried out.

Case 7. One other case may be cited, in which the direct method of examination revealed an irregular swelling in the region of the mouth of the esophagus. An esophageal bougie could not be passed. Examination with the direct speculum showed the mass on both sides of the esophagus, with a projecting tongue-shaped growth on the vertebral wall extending almost to the arytenoid cartilage. This had prevented the passage of the bougie. With the aid of the speculum, small bougies could be passed under this ledge into the esophagus. The new growth was malignant in its nature, and no cure could be hoped for.

Other instances of stricture of the esophagus, due to various causes could be quoted, but the cases I have cited give a very fair illustration of the value of the esophagoscope and direct speculum, both in the matter of diagnosis and treatment.

15 East Washington Street.

Electric Stimuli in Vertigo from Disease of the Internal Ear. F.

DYRENFURTH. *Deut. med. Wchnschr.*, April 30, 1911.

The patient is made to close his eyes, stand on one foot and bend the other knee at right angles, balancing himself merely by having his finger-tip rest on the back of the chair. One electrode is held in the hand, the other pole connected with the double electrode fitting over both mastoids. An even current is passed from both sides through the region of the vestibular nerve. Thus the slightest loss of balance immediately becomes apparent. Neurasthenics are the most sensitive. If there is unilateral labyrinthine disease present, the patient falls toward the diseased side; if there is unilateral nerve-atrophy the patient falls toward the opposite side when the node is applied. If the cathode is applied the falling-direction is reversed. Dyrenfurth reports ten cases and also experiments performed on normal subjects.

Ed.

SOCIETY PROCEEDINGS.

AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY.

Seventeenth Annual Meeting, Atlantic City, June 1, 2 and 3, 1911.

CHEVALIER JACKSON, M. D., PRESIDENT.

DISCUSSION OF DR. CHAMBERLIN'S PAPER.

(Continued from Page 1207).

DR. JOSEPH A. WHITE cited the case of a boy, eighteen years of age, who had been sent to him by Dr. Robertson of Danville. The doctor had broken all his snares in an effort to remove the growth, and, becoming tired of the case, had sent it to the speaker. The patient had a typical frog-face. The whole right side of the nose was filled with the growth, and the post-nasal spaces were partly filled. The difficulty was to encircle the growth with a snare at all. His experience had been that no wire will stand the strain in a case of this kind. He used a No. 9 piano wire, turning the nut very slowly, but finally reached a point where it would not turn at all. He surmounted this difficulty by using an irido-platinum wire. After cutting nearly through the growth by this means, it can be completely removed by the use of the electro-cautery.

He never passes a snare through the nose, but always through the mouth. As large a loop as desired may be used in this manner. It is a very simple procedure.

We are all aware of the difficulty in passing any large loop through the nose to encircle the growth. To meet this difficulty he takes a very fine child's catheter and puts a wire through it, making a twisted loop at the distal end. This is so small it can be passed through any obstructed nostril easily. When it appears in the pharynx he draws it out of the mouth and fastens the two ends of the wire loop to the small eye in the end of the catheter and pulls it back through the nose. He then passes the two ends of the wire through the cannula of the snare, but before tying it in position he encircles the growth from the back, using his finger to put the loop in position, and when he has drawn it out over the growth he fastens the ends to the snare and proceeds in the usual way to cut through the growth.

DR. LEWIS A. COFFIN described his method of using the snare tandem fashion in cases in which it had been necessary to surround the growth by a loop entered through the mouth and a stilet snare could not be threaded sufficiently near the growth to be effective. He had slipped the cannula of a second snare over the free ends of the wire, carried it well down onto the growth, and then threading his operating snare as close up to the cannula as possible, and causing the distal end of the operating snare to abut on the proximal end of the first cannula, he had a very satisfactory instrument.

He had been successful in several cases with monochloroacetic acid. In one clinical case Dr. McCullagh, of his staff, had removed nearly all of one of these tumors by means of a strong cold wire. Great hemorrhage followed, the patient being almost exsanguinated. The growth recurred, being apparently sessile. He suggested that Dr. McCullagh inject monochloroacetic acid by means of his syringe. This was done over a considerable period of time, the growth was entirely removed, and now, after a lapse of three years, there is no recurrence. He had had other cases in which the same treatment had proved equally successful. In tumors which are cystic, the acid does not act so well. It is difficult to use the needle because of the danger of catching it in the contiguous tissues. The patient must be able to assist by holding the tongue. If the treatment can be carried out it is generally successful.

DR. J. A. STUCKY said since the publication of his article on this subject seven or eight years ago he had seen four other cases of fibroma of the naso-pharynx. He had never seen a case of multiple fibroma. Three out of nine of his cases were lobulated, but none were multiple. Neither had he ever seen a fibroma which any snare would cut through. He had had Tiemann make a modification of the Jarvis snare, as long and strong as any tonsil snare, and had succeeded in getting the loop over the growth, but, despite the fact that it was kept on for twenty-four hours and that the nurse turned the nut every five or ten minutes, a point was always reached at which it would not turn. He had taken ordinary plumb-ers' forceps to turn it with, and every time had broken the snare. Finally, the wire had to be cut in two, the cannula slipped off, and the growth ultimately removed with the forceps. He had used forceps in five cases, the forceps employed being a modification of the old Brandagee forceps. By tying the soft palate back he could get a good view of the growth. He then inserted the left blade

of the forceps, then the right, and then locked them. With the mirror he looked to see that he had secured the growth. It is better to tie the carotid artery beforehand, but whether this is done or not, the tampon cord should be inserted through the nostril, with the post-nasal tampon ready for use. The growth should be loosened as a dentist loosens a tooth, before the attempt is made to remove it. He had found that one post-nasal tampon will be sufficient, and when this is removed in twenty-four or forty-eight hours there is no secondary hemorrhage.

DR. JAMES F. LOGAN emphasized the importance of a thorough pathological examination of the growth previous to operation, in order to obviate mistakes in diagnosis. He had had six cases of nasal tumors of the type under discussion. Two proved to be fibro-sarcoma. In each case the report from the first pathological examination was nasal fibroma, and, after removal of the deeper portions of the growth, the second report was fibro-sarcoma in two of the cases. The operative treatment of these two conditions is very different. For the removal of a naso-pharyngeal fibroma with a pedicle, not attached to the adjacent tissues, he used a surgeon's chain ecraseur, introduced behind the growth through the mouth. In case of fibroma-sarcoma or sarcoma he had made up his mind never to attempt to remove the growth by other method than electrolysis. One case in which he removed a spindle-cell sarcoma attached to the body of the sphenoid by means of morcellation and the snare, he succeeded in clearing the growth in the nose at the expense of a terrific hemorrhage even after ligation of the common carotid. It was necessary to transfuse normal salt solution in order to resuscitate the patient. Recurrence of the growth took place within five months. He refused to operate fearing that the patient would die on the table. He was taken to Chicago, where an operation was attempted, and the patient died on the table.

A large number of these cases occur in foreigners, principally in those from northern countries. In two cases in which he had removed the growth by electrolysis there had been no recurrence. In each case he had made three insertions of the electric needle.

DR. GEORGE L. RICHARDS asked if it be not true that there may be a change in character from fibroma to fibro-sarcoma. He had had a case referred to him as adenoids, which proved to be fibroma. He used the snare in his office with a resulting terrific hemorrhage. He succeeded in stopping the hemorrhage. The patient did not return to him, but he was able to follow the subsequent history,

from which he learned that the patient went to the hospital and died in the second year from malignant growth which was doubtless fibro-sarcoma.

DR. LINN EMMERSON had had a case of this kind in a child 11 years of age, who had already been operated upon for adenoids. He gave calcium chlorid before and after the operation. Under ether anesthesia he could not get the snare around the base of the growth, but, by means of the largest Brandegee forceps, twisted it and got it out. Alarming hemorrhage followed removal of the growth, but was controlled by gauze and the finger in the larynx. After four months there has been no recurrence in this case.

DR. CHARLES S. MEANS reported a case of naso-pharyngeal fibroma which filled the posterior nares and the vault of the pharynx so completely that he could not use any instrument except the forceps. The turbinals were enlarged, and the septum was deviated, so that it was impossible to see or operate through the nose. The patient was a boy, 15 years of age. Breathing was labored on account of the obstruction, the tumor being so large that it filled the pharynx and came in contact with the tongue. It was impossible to get any instrument or wire loop through the nose beneath the soft palate. He therefore seized the growth and by force extracted it *en masse*. It proved to have two pedicles, and was large, smooth and very dense. The pathologist pronounced it pure fibroma. Its dimensions were $2\frac{1}{2}$ inches long, $1\frac{3}{4}$ inches wide and $1\frac{1}{4}$ inches antero-posterior.

Very little hemorrhage followed the operation. There has been no recurrence, after five years.

DR. CHAMBERLIN called attention again to the differentiation between true fibroma and fibrous polypi. Pedunculated growths do not tend to recur, whereas sessile growths do.

DR. WELLS, in closing the discussion, said he could not grasp the differentiation which Dr. Chamberlin had made between pure fibromata and fibrous polypi. The distinction is one of form rather than of nature. To distinguish them from the sessile forms, we designate as fibrous polyps such as are attached by pedicles. His own cases were pedunculated, but pathological examination has proved that they were purely fibromatous. The pedicles were very tough and exceedingly firm.

Concerning the use of forceps, he believed the reports which had just been made, together with those in the literature, confirm the position which he has taken, namely, that such instruments are

to be avoided and that the snare is the instrument to be used in these cases. Perhaps he has been fortunate in his three cases, but he does not think there are any pedunculated cases which cannot be removed by a snare made strong enough. Any fibrous polyp which can be removed with forceps can be removed with the strong snares now in use.

Report of a Case of Optic Neuritis Benefited by Operation on the Sphenoid and the Posterior Ethmoid. By HARMON SMITH, M. D.

Unmistakable evidences of the favorable outcome of operations upon the sinuses for the restoration or betterment of sight have been furnished by Onodi, Posey, Holmes, and others. It may reasonably be concluded that in cases of optic neuritis where all other causes have been eliminated, operation upon the sinuses will prove successful in a large proportion of cases, provided the neuritis has not extended over too long a period. In cases where the most beneficial results were obtained there was but slight local evidence of involvement of the accessory sinuses. The author considered it unquestionably justifiable to operate on these sinuses when every other possible cause of the neuritis has been eliminated, even when there is no local or intra-nasal evidence of the existence of an empyema. Such interference may be justified as an exploratory operation. The mere depletion incidental to the operation will in itself prove of value if the neuritis be due to the pressure of a diffuse inflammation. Pressure either upon the nerve itself or upon the nutrient vessels supplying the nerve will occasion visual disturbances, so that relief of pressure, whether it be due to empyema, periostitis, or hyperemia from nasal congestion, is the object to be kept in view by the rhinologist. This can be promptly attained only by operation. Milder operative procedures have proved ineffectual in this regard.

The author's method of procedure is to remove the middle turbinate with the cold snare, remove the lower and anterior walls of the posterior ethmoidal cells with forceps and curette; enter the ostium of the sphenoidal sinus with a probe, and curet away the anterior wall from this point downwards, until sufficient space is made to employ sphenoidal forceps, when the entire wall can be removed, or enough of it removed to determine whether there is any necessity for a more radical exposure of the sinus. Drainage is all that is demanded in the majority of cases. If granulations exist it is better to remove them with forceps than to curet

the sinus. Post-operative packing will further reduce the granulations present, as well as prevent their recurrence. In the absence of granulations the author does not use packing, but sprinkles over the denuded area a few granules of thrombo-kinase, which controls the hemorrhage and does not prevent drainage. The after-treatment consists in preventing the formation of granulations by the use of fused nitrate of silver on a probe, or cutting them off with forceps, and in keeping the nose clean by douching with some alkaline solution. The eye symptoms should begin to show improvement within a week if the diagnosis has been correct and the operation successful.

Three cases with marked disturbances of vision were detailed each showing decided improvement in this regard. He has operated upon a number of cases with lesser disturbances of vision, with good results in the majority of instances. In several there has been no improvement. Upon the whole, however, he feels justified in advocating operative measures for the relief of optic neuritis in the absence of other known causes and when there are no contra-indications for operation.

DISCUSSION.

DR. LEWIS A. COFFIN said he had been interested for the past year or so in studying the visual field in the class of cases under discussion and had had every case investigated from this point of view as well as the fundus condition. In this connection he had read with interest a late paper by Wallis, of Edinburgh, published in the *Journal of Laryngology, Rhinology and Otology*, for May, 1911. Wallis quoted Onodi as saying: "Hinkel treated twenty cases of sphenoidal suppuration without finding anything abnormal in the visual fields. . . . Contrary to the findings of Gruenwald, Ziem, Bryant, Kuhnt and Berger. Henrici and Habner in thirty-six cases of accessory sinus disease found a normal visual field. These facts are to be explained . . . by the varying relation of accessory sinuses and optic nerves. There are two factors that help in the limitation of accessory sinus disease, and prevent it from spreading to the optic nerves; the nerves may come into no relation with the sphenoidal sinuses or ethmoid cells, and the wall of the sphenoid may be very thick." Wallis states that "Whilst agreeing with Onodi that the varying relations of accessory sinuses to the nerves and the thickness of the sinus walls are factors to be considered in the production of field affections, I cannot concur in his anatomical explanation as the cause of these con-

flicting statements. It seems scarcely within the bounds of possibility that certain anatomical relations of the posterior sinuses should occur in the patients of those observers who have recorded field affections, and that certain other anatomical relations should always occur in patients of those who have not found field affections." With reference to the etiology of field affections Wallis was quoted as saying "Ophthalmoscopic changes are a far more common symptom in posterior sinusitis than in the anterior, as is to be expected from the close proximity of the nerve to these cavities. . . . This is explained by the assumption that the optic nerves are directly involved by a toxic substance which has soaked through into the optic canal and orbit from the sinuses."

The speaker did not agree with Wallis in reference to the soaking through of any toxic substance to the sinuses; he does not think there is any toxic principle that acts directly upon the nerve to destroy its function, but rather that this is entirely circulatory. The venous return from the anterior cells is such as not to interfere with the optic nerve, whereas the venous return from the posterior cells is such as to interfere with the venous return of the optic nerve. This gives rise to the edematous condition. This would seem to be borne out by the fact that in disease of the frontal and anterior cells there is edema of the adjacent tissues. On the other hand, there may be orbital cellulitis and edema of the orbital part of the head while the vision remains the same, unless there is great pressure. The idea of this toxic principle must be borrowed from the oculists who have recognized and described a tonic amblyopia attributed to alcohol, tobacco, etc.

DR. WORTHINGTON: In discussing Dr. Smith's paper, a brief report of the following case will be of interest, because the patient was not only referred to me for operation by Dr. Harry Friedenwald, but Dr. Friedenwald has kindly given me a complete history of the ocular changes as they occurred.

DR. HARRY FRIEDENWALD'S NOTES.

"M. Malintourisch, a Pole aged 26 years, applied on November 29, 1910 at the Baltimore Eye, Ear and Throat Charity Hospital, complaining that the left eye had suddenly become blind two weeks previously, since which time there had also been headache and some dizziness; no vomiting. The right optic disc was perfectly normal and the vision perfect. The left eye showed an optic neuritis of the choked disc variety with two diopters of elevation. The margin of the disc was completely lost, the veins were markedly dilated and tortuous, the arteries attenuated; numerous flame-shaped hemor-

rhages. There were no other symptoms pointing to cerebral trouble and the patient was very comfortable at this time. His nose was examined by Dr. Worthington, who found distinct involvement of the ethmoidal cells on both sides. He was therefore admitted into the ward of the hospital and given general examination, without eliciting any further trouble. There was no history or evidence of lues."

My own notes at this time show evidence of chronic, non-purulent ethmoiditis, and on the left side a large middle turbinate which completely fills the space between the outer wall and the septum; yellow mucus about middle turbinate.

Diagnosis: Bilateral hyperplasia of the ethmoidal cells. The patient who had been on helmitol was given ten grain doses, every two hours through the day, and was operated upon on December 1, 1910, under cocaine. The operation was on the left side and the middle turbinate and ethmoidal labyrinth were removed together with what appeared the anterior sphenoidal wall. The inferior turbinate was likewise removed. There was a free opening into the frontal sinus. I found no pus in the cells or any evidence of necrosis, but the ethmoidal cells appeared to be distended and filled with some firm substance. The cell which I believed to be the sphenoidal contained a few drops of thick yellowish mucus. He recovered rapidly from the nasal operation, and my notes on December 13 state that the nose was almost well. The helmitol was continued for about eight days after the operation.

Further notes are taken from Dr. Friedenwald's:

"There was a marked improvement in the ocular condition after the operation. In three days the neuritis became distinctly less marked. On December 13 the patient could count fingers at a distance of several feet. On December 20 the vision of the left eye had risen to 20/50, and there was marked improvement in the condition of the papilla. The swelling had almost entirely disappeared and the inflammation was very slight. No elevation could be made out. The margin of the disc was becoming well defined. The patient was discharged December 24 cured and with almost perfect vision in the left eye.

"He returned January 5, 1911, with complaint that the right eye was beginning to trouble him. At this time the left eye appeared perfectly normal and vision 15/20, but the vision of the right eye, which had been previously normal, was 20/200, and there was now the same picture in this eye which had previously been noted in the left, namely, a marked optic neuritis, but without hemorrhages and not as intense as in the other eye. There were no other cerebral symptoms accompanying trouble. The patient was again admitted to the hospital, but for purposes of observation only, and was placed upon helmitol so as to reproduce the condition under which he had been placed during his

previous stay, but without undergoing the nasal operation. He went through the same course. The inflammation rapidly subsided, and disappeared entirely with complete restitution of vision. He was discharged February 2d, V. R. E. 20/20; V. L. E. 20/30. During his stay at the hospital there were no signs or symptoms of cerebral trouble discovered."

Note—(Also by Dr. Friedenwald):

"The rapid and complete disappearance of the optic neuritis in the left eye following almost immediately after the nasal operation corroborated the diagnosis first made that the neuritis was due to nasal trouble. The course of the neuritis in the right eye shows that this view was erroneous. It is not impossible that the rapid improvement in both eyes may have been due to the helmitol, which was given in large doses during the whole period of his stay at the hospital."

I can but agree with Dr. Friedenwald's conclusion: That the use of the hexamethylenamin preparation in this case very probably did more for the man than did the operation. The cases of optic neuritis which have been referred to me with disease of the fronto-ethmoidal or sphenoidal sinuses have with exceptions improved or recovered from the eye symptoms after operation even before the use of hexamethylenamin in sinus disease was known.

DR. WOLF FREHDENTHAL reported two cases. The first was a man 35 years of age, who consulted him two and a half years ago at the suggestion of his ophthalmologist. He could not see very well on the right side. Examination revealed empyema of the sphenoidal sinus, radical treatment to prevent loss of eyesight was recommended. The patient disappeared and did not return for two years. When he came back the sight on the right side had entirely disappeared, and on the left side it was materially weakened. He had had nothing done in the meantime. One year ago the ophthalmologist examined him and found the left eye perfectly well. The speaker removed the posterior ethmoidal cells and the anterior wall of the sphenoidal, and the patient said he was easy in the head for the first time. The suppuration of the sphenoidal sinuses was not yet cured. X-ray pictures showed the sphenoidal cells, an anterior and a posterior cell. He was afraid to go too deep into the sphenoidal sinus because of the danger of entering the cranial cavity. The sight in the left eye is stationary. There is no toxic infection but pressure upon the nerve.

DR. NORTON L. WILSON, referring to the question of the possibility of direct pressure producing optic neuritis, called attention to a case which he reported before the Eastern Section five years ago.

The frontal and ethmoidal sinuses were involved and when he performed the Killian operation he found that the abscess had broken through the wall into the orbital cavity, causing pressure upon the optic nerve.

DR. FRANK ALLPORT said that one of the previous speakers seemed to feel that ophthalmologists are not at all accurate in their diagnosis of toxic amblyopia. He desires to say that scarcely any eye disease is so easily diagnosed as that resulting from alcohol or tobacco poisoning, the symptoms of which are so characteristic that they can scarcely be misunderstood. The connection between ophthalmology and rhinology is extremely close, and is of even greater importance to the ophthalmologist than it is to the rhinologist. There can be no question but that a great many eye diseases originate in diseases of the nose or accessory sinuses. Dr. Allport said that this fact was so well established that it had become a routine practice in his office to have all eye diseases of doubtful origin examined by an expert rhinologist in his office, as to the condition of the nose and accessory sinuses. He does not believe that ophthalmology can be really successfully practiced without a knowledge of the intimate association existing between eye diseases and nose diseases. The ophthalmologist who does not take into consideration this important fact must invariably miss one of the most important diagnostic and curative features of his profession.

DR. SMITH, in closing the discussion, said there might be circulatory disturbances without a purulent condition adjacent, but there could not be a purulent condition present without circulatory disturbances. Referring to Dr. Beck's remarks concerning anti-syphilitic treatment, he said that all the cases cited had had that treatment. They had had strychnia also. Of course one was inclined to be sceptical about the anti-syphilitic treatment unless given individually, but in his cases the condition was progressive and he could not wait long enough to put the patients on anti-syphilitic treatment. He had one patient who could see on the day before the operation and who could not see at all on the day of the operation, thus demonstrating the rapidly progressing disturbance. With this progressive condition where all other possible causes have been eliminated, one should not hesitate to go in and relieve the pressure, no matter to what the pressure be due.

Preservation of the Anterior Wall in Radical External Frontal Sinus Operation. By THOMAS J. GALLAHER, M. D.

Original Contribution to THE LARYNGOSCOPE, p. 1074, November, 1911.

DISCUSSION.

DR. H. HOLEROOK CURTIS said he was the first member to have read a paper on the frontal sinus operation before the society. He had shown three cases in the 1902 meeting at Washington in which he had operated through the anterior wall and treated the wound, after curetting and making a wide opening into the nose, exactly like in a mastoid operation. The cavity was repeatedly packed until obliterated. Coakley later reported 104 cases done by this method.

Though it was the opinion of the speaker that the operation through the anterior wall was the safer operation, the deformity which resulted led him to seek other methods.

Killian about this time proposed his method of saving the ridge, which in many instances was an ideal operation. Latterly, however, Killian was preserving much more of the anterior wall than at first. To-day the external operations are being done entirely too often.

It was very easy to break down all the ethmoid cells and by means of the instruments employed by Ingals, Miles, himself and others, to remove the structures rendered fragile by the inflammatory process and efficiently drain the sinuses. The removal of the middle turbinate, all the ethmoid cells and effect an entrance to the sphenoid is easily done in fifteen minutes after cocaine anesthesia. Until recent times it was thought necessary to remove the inferior wall of the frontal to do this. The future would show much fewer external sinus operations; there would be hardly any if the specialist got the cases in time.

DR. ROSS HALL SKILLERN said the preservation of the anterior wall as Dr. Gallagher himself states is not a new one and it would be merely a useless repetition and waste of time to attempt to apply it to all cases of frontal sinusitis requiring an external operation.

It is the general consensus of opinion that it is inapplicable in the majority of cases on account of the numerous fistulae which follow.

Von Eichen, while Killian's assistant, in summing up the results of the Freiburg clinic for eight years laid particular stress upon this point and has seen many cases of fistula formation after leaving the anterior wall intact, sometimes several years after the operation, which requires subsequent surgical intervention. In certain well selected cases this form of operation may be indicated, I mean those in which the sinus does not extend high in the frontal bone and is of regular contour. In other words one in which we can reasonably expect complete obliteration by the ascension of the orbital fat. If recesses and hollows remain which have not been thoroughly reached, failure more or less complete will certainly result.

Ritter (*Deutsche Medizinische Wochenschrift*, 1906) endorsed this infra-orbital method sparing the anterior wall but has since abandoned the procedure after having reported two deaths following its application.

DR. D. J. GIBB WISHART said he was in Vienna when Killian reviewed his cases, some six of them having been operated upon two years before they were reported. He had had the pleasure of seeing these cases, and was impressed by the absence of deformity.

DR. WALTER A. WELLS cited a case which illustrated the natural tendency of frontal sinus disease to recover. The case presented all the symptoms which urgently indicate radical operation, and he performed the Killian operation, when he found a complete breaking down of the septum. He did not think it wise to do a double operation, but anticipated having to do the other side later. Not only did the side operated upon clear up completely, but the other side also, and there has been no return of the symptoms during the two years which have elapsed since the operation.

DR. GALLAGHER, in closing the discussion, said that he never resorted to the external operation until after the intra-nasal operations had failed. He believed the lower Killian operation would succeed in most instances, thereby saving the anterior wall and preventing deformity.

Accessory Sinus Suppuration in Scarlatina. By THOMAS HUBBARD, M. D.

Nearly all cases of scarlatina having so called "purulent rhinitis" have sinus suppuration in varying degree of severity. Some die from this cause, many recover spontaneously, and between these two extreme groups there is a class which presents distinct indications for surgical treatment. The very severe type usually die from meningitis or septic thrombosis of the venous sinuses with metastases; and chronic suppuration with complications, necrosis and fistula formation is the fate of those having sinus suppuration of moderate degree of severity unless aided by timely surgery.

All of the exanthematous diseases should likewise be regarded as initial causative factors of acute and chronic nasal and sinus suppuration; and these cases should be treated by the rhinologist during the acute stage with the purpose not only to prevent ear infection, but also to prevent sinus empyema, which terminates at best in chronic suppuration. As a general rule the same surgical

axioms apply in accessory sinus suppuration with symptoms of septic thrombosis as are applicable to mastoiditis.

The author reported a case of scarlatina complicated by purulent mastoiditis, the suppurative sinusitis involving the frontal, ethmoidal and maxillary sinuses. Recovery followed operations. Autogenous vaccine treatment was begun on the fifth day after the sinus operation because of increasing fever, pus, etc. This treatment seemed to establish a decided change for the better, and it was continued into convalescence.

DISCUSSION.

DR. HENRY O. REIK said he had had the privilege of serving as Consulting Otolologist to the Infectious Diseases Hospital, managed by the Board of Health of Baltimore, and had been impressed here and elsewhere by two features of scarlet fever cases. The first is the ignorance of general practitioners concerning the relationship between infectious diseases and the accessory nasal sinuses. The second is the ignorance of rhinologists on the same subject. The ignorance of the general practitioner is more excusable than that of the rhinologist. The otologist has been hammering away at the subject so long that the men in charge of these hospitals have come to be pretty "keen" in regard to the association of scarlet fever and middle-ear disease. They are awake to the possibilities of involvement of the tympanum and mastoid and do not wait long before either acting themselves or consulting a specialist.

With regard to the nose it is different. The attending physician has not been impressed with the importance of nasal infection in scarlet fever, and has been allowed to believe that if infection occurs, it is partly his fault, hence he is less likely to report it. Infection of the nose is not necessarily the fault of the physician any more than is infection of the ear, but the text-books often lead general practitioners to think so.

It is important to bear in mind how frequently chronic rhinitis of a purulent character, or involvement of the sinuses, may be traced to scarlatinal infection. In most infectious disease hospitals, scarlatinal cases are not allowed to leave until the purulent otological condition has been cured. This does not apply, however, to the rhinological region, patients often being allowed to go out while still subject to a purulent discharge from the nose.

The Teaching of Oto-laryngology in Under-graduate and Post-graduate Medical Schools. By MACCUEEN SMITH, M. D.

Original Contribution to THE LARYNGOSCOPE, p. 829, August, 1911.

DISCUSSION.

DR. JOSEPH H. ABRAHAM confined his remarks chiefly to post-graduate work. In under-graduate schools the teaching of the normal anatomy of the nasal cavity is very deficient. In the teaching in post-graduate schools certain difficulties might be enumerated. First, the average student comes to take a special or general course, the length of which is usually about three months. Second, he desires to see the professor operate and does not care to listen to didactic lectures. Third, the minute anatomy of the upper respiratory tract is practically unknown to him. Fourth, histology is almost entirely unknown to him. Furthermore, physicians come to prepare themselves for a specialty who are not able to handle instruments for examinations, especially the head-mirrors, the rhinoscopic and laryngeal mirrors. They cannot make a rhinoscopic examination.

The course which the speaker endeavors to give is to first operate upon the cadaver, the classes being limited to four students. This costs fifty dollars, which they seem to consider expensive. Six bodies are used in the course. Eight lectures, of about an hour and a half each, are given with this part of the work. Before this operative work is given the gross anatomy is demonstrated upon various cut sections. The majority of students consider this course too high, and do not take it.

After the anatomy lessons are finished the clinical work is taken up. The histories of the patients are carefully gone over, the various pathological lesions pointed out, and the diagnosis made. This does not seem to attract the students. At this stage of the instruction as few operations as possible are shown, as they are not prepared to benefit by them. The histology and pathology should, in the meantime, be given in a special course.

The students are then given patients to treat. The deficiency in ability to handle instruments is now discovered. Many of the men cannot examine the nose or larynx, they cannot even control a head-light. After they have mastered the methods of examination, the handling of the instruments, and the diagnosis, they are then given minor operations. The chief aim of most of them is to do a sub-mucous operation, and to remove adenoids and tonsils.

DR. WENDELL C. PHILLIPS said it is a matter of pride and congratulation that a deceased member of this society, Dr. D. B. St. John Roosa, became the founder of post-graduate medical education in America. Dr. Roosa did more for the advancement of post-

graduate work than any other single member of the profession in this country.

In a private conversation with Dr. Knowles, on the journey down, the latter regretted the use of the term "post-graduate." The speaker agreed with him. It should be called advanced medical education.

Teachers in post-graduate institutions have to deal with two general types of practitioners: First, those who feel the need of higher medical instruction in order to be able the better to conduct their own work as general practitioners; second, those who desire to lay the foundation for specializing in the various branches of medicine and surgery. The two classes of practitioners require different teaching. The post-graduate institution should meet this demand. At the New York Post-Graduate Medical School and Hospital this demand has been met. In the department of otology and rhinology the general practitioner is permitted to attend the clinical lectures of the teachers, and all operations and demonstrations, and is encouraged to examine all cases and to draw upon charts his findings.

With especial reference to otology, his branch, Dr. Phillips spoke of the deplorable ignorance of the average medical man, despite the fact that an unusually high order of physicians attend the courses. Very few of them have ever seen a drum membrane with reflected light. The majority of them are very glad to overcome this deficiency, and welcome the practical instruction which they receive. He laid great stress upon the teaching of otoscopy, first showing the normal drum membrane, with the landmarks, etc. When the student has learned this, he is then taught the pathological conditions, after which he is allowed to witness operations. This course is covered in from three to six months.

Dr. Phillips hoped he would never hear again that it is the aim of post-graduate schools in this country to send out specialists after from six weeks to three months' instruction. Only recently he had heard a clinical professor in an under-graduate institution make this criticism in an after-dinner speech at a medical dinner. He thus showed his ignorance of the facts. In the above school these special students are distinctly told that they should not attempt to practice without giving from one to two years to prepare for it. The number of men who come prepared to devote a year or more to such special study is increasing every year.

He has become convinced that in both under-graduate and post-graduate schools the tendency is to swing too far away from didac-

tic teaching. He considered this a mistake, and in his work at the Post-Graduate he gives each year a few didactic lectures on the diseases of the ear.

The gross and minute anatomy, physiology, pathology and histology of the ear are taught in special courses, and these are taken by the majority of the students.

They are also given a special course in the operative surgery of the ear, a course which the speaker had the honor of founding in the above named school. Each student performs the entire list of operations on the cadaver.

It is the custom in the Post-Graduate School, after a man has taken all these courses and has witnessed all the operations, to permit him to operate upon the living subject under the immediate supervision of a professor. For this a special fee is charged. Courses on the living are also given in other departments of the school. It is very encouraging to the practitioners throughout the country to know that they can receive this kind of instruction.

In order to accomplish the work just outlined the proper hospital equipment is necessary. In no country are there better hospital facilities than in America. At the Post-Graduate and at the Polyclinic there is ample provision for the work. The Polyclinic is building a magnificent institution, and within three months the Post-Graduate will have a hospital capacity of about four hundred beds, the hospital and school being all under one roof.

Dr. Phillips did not agree with the pessimistic remarks of Dr. Myles. The pride of otologists, and of all specialists, should be to make America a center for advanced medical instruction. This is sure to come, and American enterprise and devotion will accomplish it. We are already successful rivals of the best of European institutions.

He regretted that any post-graduate institution gives certificates unless upon examination. In the New York Post-Graduate certificates signed by the president and secretary, stating the exact instruction received are given, but are not signed by the professors.

DR. CHARLES P. GRAYSON confined his remarks chiefly to the teaching of laryngology in under-graduate schools. "*Poeta nascitur, non fit*" applies even more to the specialist than to the poet. He doubted the advisability of devoting more time to special work in laryngology in under-graduate institutions. The student receives instruction in this branch in his third year, during which time he is not only given a knowledge of the more common diseases of this

region, but is made to realize the unavoidable limitations of the general practitioner. In other words, to know when his own ability ceases and when he should seek the assistance of the specialist. A good deal of danger results from teaching these young men enough to make them think they are specialists. He particularly warned his students against undertaking certain cases, which the short period of instruction cannot fit them for treating.

In an elective course the teacher should do some of the electing. He agreed with Dr. Dench that it is a waste of time to try to teach those who have neither fitness nor liking for the work. In the first hour's instruction the teacher can discover whether a student has or has not any talent for special work. Some men can never learn to handle instruments skillfully, whereas others have a light and delicate touch from the beginning. It is useless to waste time with the former class.

Without adding to the time already allowed in the curriculum, students could be taught didactically in the third year sufficient to make them safe, if not accurate diagnosticians, and in the fourth year they could be given all the clinical work which is necessary. Operative work should be confined to post-graduate institutions. Dr. Grayson thought it much wiser to endeavor to discover and develop ability than to give exhaustive information which, failing of complete digestion, might often be misapplied.

DR. MAX A. GOLDSTEIN said it is evident that there is a wide difference of opinion as to how under-graduate students should be taught. He wished to emphasize very strongly the moral obligation of every teacher of oto-laryngology to give to his pupil just as much as possible of the subject-matter comprising the given specialty. The student, after three or four years in college, goes out to practice and he will do tonsil and adenoid operations, treat acute and chronic otitis media, etc., and he will not send these cases to the specialist. He will send the more extensive and difficult operations, such as the mastoid, to the specialist, but the others he will undertake himself. The moral responsibility, therefore, rests upon oto-larynologists as teachers to train the student in the diagnostic, therapeutic and operative work which is a part of his general practice.

Dr. Goldstein allows his senior students to operate under direct supervision, upon tonsils and adenoids, to incise drum-membranes, etc., thus making them more definitely familiar with the instruments and more confident in themselves. He did not see why there should

be an embargo placed upon operations which it is necessary for the graduate to perform as soon as he gets out into practice. If a man goes to a post-graduate school without knowing how the drum-membrane looks, it is the fault of the teachers in the under-graduate school.

DR. J. A. STUCKY spoke in behalf of the men who take post-graduate instruction, either in Europe or America, or both. It is well for Americans to hear criticism of these fellow-Americans. The men to whom he referred are no ordinary individuals but doctors who are graduates of the best schools in America and who have taken post-graduate courses after having practiced medicine for several years. These men say that Americans are too superficial, in too big a hurry, and that they attempt to teach more than students, as general practitioners, can utilize. The instruction, furthermore, is veiled in so much mystery that the students are confounded. He spoke especially of three men who are doing splendid work. What they wanted and what the average doctor wants is to learn enough to advise the patient what to do. The speaker was not convinced that the average man who takes a post-graduate course does so with the idea of developing into a specialist. If so, this idea should be discouraged, but the diagnostic part of the eye, ear, nose and throat work should be emphasized. He had seen several men holding post-graduate certificates attempt to remove turbinates, with serious results. Certificates which grant the legal right to practice a specialty should not be carelessly granted.

(To be continued.)

Large Cyst of the Middle Turbinate of Dermoid Contents.

H. GAUDIER, *Rev. hebdomadaire de Laryngologie, d'Otologie et de Rhinologie*, p. 97, Jan. 28, 1911.

The case presented no unusual symptoms. The patient was a girl of 15 years whose left nostril was obstructed by a cyst of the middle turbinate, with dermoid contents. The author proposes two theories to explain its origin, namely, as due to an inflammatory condition or congenital.

ED.

